UNIVERSITY of York

This is a repository copy of *Non-native plants add to the British flora without negative consequences for native diversity*.

White Rose Research Online URL for this paper:
https://eprints.whiterose.ac.uk/85229/

Version: Accepted Version

Article:
Thomas, Chris D orcid.org/0000-0003-2822-1334 and Palmer, Georgina orcid.org/0000-0001-6185-7583 (2015) Non-native plants add to the British flora without negative consequences for native diversity. Proceedings of the National Academy of Sciences of the United States of America. 201423995. pp. 4387-4392. ISSN 1091-6490

https://doi.org/10.1073/pnas.1423995112

Reuse
Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

White Rose university consortium
Universities of Leeds, Sheffield & York

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk/

Thomas, C. D., & Palmer, G. (2015). Non-native plants add to the British flora without negative consequences for native diversity. *Proceedings of the National Academy of Sciences, USA* 112 (14), 4387–4392.

doi: 10.1073/pnas.1423995112

AUTHOR FINAL COPY

Short title: Non-natives increase floral diversity

C D Thomas[1]* and G Palmer[1]

Author affiliation: [1]Department of Biology, University of York, Wentworth Way, York YO10 5DD, UK

* chris.thomas@york.ac.uk

Keywords: alien, biodiversity, conservation, invasive species

Abstract
Plants are commonly listed as invasive species, presuming that they cause harm at both global and regional scales; ~40% of species listed as invasive within Britain are plants. Yet invasive plants are rarely linked to the national or global extinction of native plant species. The possible explanation is that competitive exclusion takes place slowly, and that invasive plants will eventually eliminate native species (the 'time-to-exclusion hypothesis'). Using the extensive British Countryside Survey Data, we find that changes to plant occurrence and cover between 1990 and 2007 at 479 British sites do not differ between native and non-native plant species. Over 80% of the plant species that are widespread enough to be sampled are native species, and hence total cover changes have been dominated by native species (total cover increases by native species are over nine times greater than those by non-native species). This implies that factors other than plant 'invasions' are the key drivers of vegetation change. We also find that the diversity of native species is increasing in locations where the diversity of non-native species is increasing, suggesting that high diversities of native and non-native plant species are compatible with one another. We reject the 'time-to-exclusion hypothesis' as the reason why extinctions have not been observed, and suggest that non-native plant species are not a threat to floral diversity in Britain. Further research is needed in island-like environments, but we question whether it is appropriate that over three-quarters of taxa listed globally as invasive species are plants.

Significance (120 words)
Non-native plants dominate global lists of invasive (harmful) species, yet plants introduced to Britain are less widespread than native species, are not increasing any more than native plants, and changes to native and non-native plant diversity are positively associated. The hypothesis that competitive exclusion will eventually enable introduced plants to drive native species extinct receives no support, based on analysis of extensive British data. A more parsimonious explanation is that both native and introduced plants are responding predominantly to other drivers of environmental change. Negative impacts of non-native plants on British biodiversity have been exaggerated, and may also have been exaggerated in other parts of the world.

Introduction

The Global Invasive Species Database (1) lists 3163 plant (Plantae) and 820 animal (Animalia) species as invasive because they "threaten native biodiversity and natural ecosystems" in the regions to which they have been introduced. Given the relative numbers of animal and plant species that have been described (2–4), this implies that the per-species likelihood of being listed as invasive is approximately 25 times higher for plants than for animals. For the United Kingdom, 49 out of 125 species (39%) categorised as invasive in the same database are plants (1), and a more detailed analysis included 102 plants in a list of 244 non-native species (~42%, depending on taxonomic designations) that have negative ecological or human impacts in Great Britain (5, 6). These numbers imply that non-native plants must be key threats to biodiversity both globally and in Britain. It is surprising, therefore, that examples of regional-scale or species-level extinctions associated with invasive plants are apparently rare (7–12).

Most extinctions associated with introduced species have been caused by invasive predators and diseases encountering 'naïve' prey and host species in distant and isolated parts of the world (13–19). Putative examples of competitive exclusion in the invasive species literature have usually turned out to be examples of apparent competition, whereby the invading species is more resistant than native species to a shared pathogen (17–19), rather than traditional interference or exploitative competition. The difference between the impacts of invasive plants and invasive predators and diseases could, however, simply be a function of time. If non-native plants spread slowly but inexorably, relatively short-term increases could drive regional or global extinctions on centennial or millennial time scales. Introduced plants have certainly contributed to vegetation change in many isolated environments, such as the Hawaiian islands and the ecologically-distinct fynbos vegetation in South Africa (10, 20–22). They can also become abundant in some continental regions, and hence they have the potential to alter ecosystems and exclude native species over long periods of time (23–26). We refer to the proposition that ongoing increases in the distributions and abundances of non-native plants will cause long-term competitive exclusion of native plant species as the 'time-to-exclusion hypothesis'.

However, short-term and local gains by non-native species do not automatically result in long-term and large-scale extinctions of native species. Competition may be insufficient as a mechanism to drive many or any native plant species extinct, other than at a local scale (27, 28). A failure of competition to exclude native species at regional or global scales could arise because introduced plants deplete the resources they initially thrive on and accumulate herbivores and diseases, which together apply density-dependent control on introduced species before they can exclude the native plants. In addition, native plants may have the capacity to out-compete or co-exist with the invaders, at least in some local environments (29–33).

The time-to-exclusion hypothesis is difficult to test because regional-scale and global exclusions are predicted to take place far into the future. However, it is possible to evaluate two conditions that need to be met if past introductions are likely to cause future extinctions. First, non-native plant species that established in the past should be continuing to increase more than native species. By contrast, if cover changes of native species are larger than those of the non-natives, it implies that other environmental drivers feature more strongly than biological invasions in altering the composition of communities. Second, although individual non-native species may fail to cause exclusion, this may be achieved through an increasing diversity of aliens, leading to the prediction that changes in native diversity will be negatively correlated with changes in the number of non-native species. Britain provides an excellent testbed for these predictions, partly because plant species have been introduced for several thousand years, providing opportunities for non-native species to spread and increase in numbers, and partly because an extensive stratified random sample of plant species in Britain (the British Countryside Survey) provides robust data to address these two key issues.

Results

Plant distribution sizes. Native plant species dominate Countryside Survey samples of the British flora: native species constituted 83% of the 636 plant species that were recorded in at least one of the 479 study sites in 1990 (native = 529 species; archaeophytes introduced up to 1500 = 60 species;

neophytes introduced after 1500 = 47) and 82% of the 677 species recorded in 2007 (native = 553, archaeophyte = 68, neophyte = 56). The apparent differences in species totals between years mainly reflect rare species only recorded in one site in one of the years (Dataset S1). Native species formed 85% of the 531 species that were recorded in at least one site in both years (native = 450, archaeophyte = 51, neophyte = 30), and 89% of the 217 species recorded in at least ten sites in both years (native = 193, archaeophyte = 16, neophyte = 8).

The 50 most-widespread plant species – measured by frequency of occurrence in sites in 2007 – were all native species, and only seven non-native species were in the top 100 (Figure 1). Of these seven non-natives, three were neophytes (*Veronica persica*, *Acer pseudoplatanus, Brassica napus*), and four were archaeophytes (*Capsella bursa-pastoris*, *Alopecurus myosuroides*, *Geranium dissectum* and *Viola arvensis*). The most-widespread native species *Holcus lanatus* (present in 330 sites in 2007) was much more widespread than either the most-widespread neophyte *Veronica persica* (86 sites in 2007) or archaeophyte *Capsella bursa-pastoris* (62 sites in 2007) (Dataset S1). Native species and archaeophytes were more widespread than neophytes, although native species and archaeophytes did not differ significantly (Figure 2A, Table 1).

Changes in numbers of occupied sites between 1990 and 2007 were numerically dominated by the native species; the largest absolute changes were by native species (Figure 3A), which might have been expected given that over 80% of the species considered were native (above). The frequencies of occurrence of some species increased and others decreased over time, such that there were no significant differences between the three plant categories in the change in number of occupied sites ($\chi 2$ (2) = 4.29, p = 0.11; Figure 3A, Dataset S1).

<u>*Plant cover*</u>. Eleven non-native plant species were in the top 100 by plant cover, of which eight were the more recently introduced neophytes (Figure 1B, Dataset S1). The most abundant native species *L. perenne* had a higher mean percentage cover per site (mean cover in 2007 = 11.09%) than the most abundant neophyte (*Picea sitchensis*; 2.36%) or the most abundant archaeophyte *Castanea sativa* (0.17%); *C. sativa* only ranked 74th (six neophytes ranked ahead of it: *P. sitchensis*, *B.napus*, *A. pseudoplatanus*, *Lolium multiflorum*, *Picea abies* and *Pinus contorta*; Figure 1B, Dataset S1). The median cover per neophyte species was significantly greater than that of archaeophytes in both years, and of native species in 2007 (Figure 2B, Table S1, Table S2); native species were more abundant than archaeophytes in both surveys (Figure 2B, Table S1, Table S2). Nonetheless, almost all species of all three categories had very low cover (<<1%; Dataset S1).

The majority of species (60%; n = 130; native = 114, archaeophyte = 10, neophyte = 6) increased in cover between the two time periods, 48 species showed no change in cover (22%; native = 43, archaeophyte = 5, neophyte = 0), and the cover of 39 species declined (18%; native = 36, archaeophyte = 1, neophyte = 2). The largest declines and increases were of native grasses: *L. perenne* (-1.88%) and *Nardus stricta* (-0.28%), *Poa trivialis* (+1.32%) and *H. lanatus* (+2.91%) (Dataset S1).

There were no significant differences between native species, archaeophytes, and neophytes in terms of changes in plant cover between 1990 and 2007 (Figure 3B; $\chi 2$ (2) = 2.44, p = 0.30). Summed across <u>increasing</u> plant species, 9.6 times as much cover change is associated with increased cover of native species compared to non-natives (sum cover change per quadrat per site of natives = 17.47%, archaeophytes = 0.36%, neophytes = 1.46%). Native species continue to form the clear majority of widespread and abundant species (Figure 1, Figure 2), and dominate changes in abundance (Figure 3B).

<u>*Diversity changes*</u>. There was a significant positive relationship between changes in the diversity (richness) of native and non-native species in each site, between 1990 and 2007 (Figure 4), suggesting no loss of native diversity with increasing non-native diversity. Non-native species could potentially still contribute to declines in native diversity in the subset of 235 sites that exhibited a net loss of native species, and so we repeated some of the above analyses for this subset of sites. Within these sites, 73 species (65 natives, 5 neophytes and 3 archaeophytes – out of 155 species that were recorded

in 10 or more sites in both survey years) increased in cover between surveys, and could potentially contribute to declines in native plant diversity. As in the data set as a whole, the cover changes per species were not significantly different between the three plant categories (χ^2 (2) = 5.33, p = 0.07). The greatest absolute cover increases in these 235 sites were again by native species. The top five native species that increased in cover were: *H. lanatus* (+2.71%), *P. trivialis* (+1.11%), *Molinia caerulea* (+0.94%), *Trichophorum cespitosum* (+0.81%) and *Juncus effusus* (+0.67%). The three archaeophytes which increased in percentage cover between the two surveys were: *Avena fatua* (+0.13%), *Anisantha sterilis* (+0.07%) and *G. dissectum* (+0.02%). The five neophytes that increased were: *P. sitchensis* (+1.14%), *B. napus* (+0.60%), *A. pseudoplantus* (+0.15%), *V. persica* (+0.05%) and *L. multiflorum* (+0.04%). For these 'increasing' species in these 235 sites, the sum of cover increases for natives was 12.3% (n = 65 species), archaeophytes was 0.22% (n = 3 species) and neophytes 1.98% (n = 5 species), indicating that total increases by native species were 5.6 times greater than total increases by non-native species.

Discussion

The 'time-to-exclusion hypothesis' requires species that were introduced a long time ago to continue to expand and become more abundant over time, such that they might eventually drive regional-scale extinctions of native species by competitive exclusion. This was not the case in the present study. Changes in the frequencies of occurrence (distribution) and average plant cover (abundance) in a large, stratified random sample of the British countryside provide no evidence that non-native plant species continue to expand and increase in abundance, relative to native species. Furthermore, native plant species diversity increased in places where non-native plant diversity increased, providing no support for the hypothesis that communities of non-native species will eventually out-compete native plants. This parallels the finding that increased numbers of non-native plant species have established in the USA in locations with high native species richness (34). Non-native species have also increased in locations where humans have created novel environments, particularly in urban environments (35), which were not included in the Countryside Survey. For Britain, at least, the non-native species have supplemented rather than excluded the native flora.

Using repeat census field survey data for British plants from 1990 and 2007, we find that the sum total of area changes of native plant species is an order of magnitude greater than the changes to the abundances of non-native species, indicating that native rather than non-native plant species dominate vegetation changes. This strong influence of native species arises because there are more native plant species (85% of the 531 plant species recorded in at least one site in both surveys) and they tend to be more widespread (Figure 1A, Figure 2A), rather than because there were any fundamental differences in the population trajectories of plants that arrived in Britain at different times in the past. These same quadrats only detected 81 (<5%) non-native plant species, present in both survey years, out of a total of 1728 non-native plant species in the flora (36); emphasising that most non-native species remain too localised to have national-scale impacts on other species.

The behaviour of neophytes and archaeophytes was indistinguishable from that of native species, measured as changes in numbers of sites occupied and in changes in percentage cover (Figure 3, Table 1). Some archaeophytes have continued to spread, as required by the 'time-to-exclusion hypothesis', but others have contracted and declined in abundance (Dataset S1). Nonetheless, there were two differences between the three groups of species. Native species and archaeophytes were more widespread than neophytes, suggesting that increased time may provide opportunities for range expansion (37), despite the fact that recent rates of change do not differ (Figure 3A, Table 1). Secondly, the more recently-established neophytes were more abundant than archaeophytes and native species, in terms of mean plant cover per species. The difference between neophytes and native species can be attributed to direct management. Five of the six most abundant neophytes are actively planted for wood products (*P. sitchensis*, *P.abies*, *P. contorta*), vegetable oil (*B. napus*), and grass forage (*L. multiflorum*), and hence their high abundances are associated with continuing forestry and farming interventions, rather than being cases of biological invasion following their initial introduction.

When these five neophytes were excluded, native species and neophytes no longer differed significantly in their average cover ($p = 0.05$ for 1990, $p = 0.26$ for 2007), although the remaining neophytes still had significantly greater cover than archaeophytes in 2007 ($p = 0.05$ for 1990, $p = 0.005$ for 2007; the native/archaeophyte analysis was unaffected; Table S1). Excluding these five neophytes, there were still no significant differences between the three groups of plants in their changes in abundance or distribution (Table S2). These results indicate that there are some differences in the histories and management of the three groups of plants (which is clearly true, given their different times of arrival in Britain), but that their recent performances (distribution and abundance changes) have not differed.

Although the changes in frequencies of occurrence and abundances were only recorded over a period of 17 years, this duration was sufficient to detect a significant positive correlation between diversity changes of native and non-native species, the opposite of what might have been expected if non-native species were in general causing declines in native diversity. Of course, some non-native species become common in some locations and thereby alter the local flora (and there may be local implications for conservation), but we find no evidence that non-native species drive such changes at a national scale, or that they do so any more than native species. In fact, we find the reverse – cover increases by native plants were greater than cover increases by non-native plants.

Whether our conclusions will apply to isolated and endemic-rich floras requires further examination. The glacial history of northern Europe may have resulted in incomplete saturation of the present-day flora (38, 39), and hence an increased capacity to assimilate new introduced species without driving native species extinct. However, Britain is not exceptional in this. A considerable portion of the world's land surface has undergone major vegetation change since the last glacial maximum (40, 41), and the new vegetation of many regions may not have become saturated with species in the Holocene. The tendency for plant introductions to increase regional diversity, even on oceanic islands (which are also unlikely to be saturated) (27), and for biotic exchanges to increase net diversity on geological time scales (42, 43) suggests that other regions may also be able to assimilate large additional floras without (many) losses. We do not dispute that major vegetation changes associated with invasive plants can arise when new plant functional types arrive in regions that lack them (e.g., 44, 45). However, we suggest that they are not representative of changes over much of the Earth's land surface.

If interspecific competition has been contributing to changes to the composition of British plant communities in recent decades, then it is helpful to consider which species might be responsible. The largest absolute changes, in terms of numbers of sites and cover, were by native rather than by non-native species. Summed across species, over nine times as great a total cover increase was achieved by all native species, compared to increases by all non-native plants (combining neophytes and archaeophytes). Native species also dominated abundance changes in the subset of sites where native species diversity declined. Thus, any competitive effects must predominantly have been caused by species that are longstanding members of the native flora, rather than by introduced plant species.

The lack of significant differences in abundance and distribution trajectories of introduced and native plants – some increasing and some decreasing – implies that factors other than date of introduction have been more important determinants of the fates of each species over the past few decades. Changes to the abundances and frequencies of occurrence of plants in the countryside, of which there are many, predominantly represent species-specific responses to environmental drivers, such as nitrogen deposition, changed land management and climate change (46–49), rather than to invasion. We suggest, therefore, that the prominence of non-native plants in lists of invasive species is likely to be out of proportion to the real threat that they pose to other species.

Materials and Methods

Data acquisition and species classification

Countryside Survey (CS) data were downloaded from www.countrysidesurvey.org.uk (accessed 27/08/2014). The CS comprises field surveys in 1km^2 sites in England, Wales and Scotland – sites

were selected to provide a representative sample of environmental types in Great Britain (GB) (49). Within each site, detailed surveys of vegetation are carried out. We use data collected from the large 'main' quadrats (200m^2), which are randomly placed within each site (50); the number of these quadrats per site averaged 4.81 ± 0.61 SD across the two surveys (49). We use CS data from sites visited in both 1990 and 2007, which covers a sufficient period and number of repeat-sampled sites (n = 479 sites) that we could calculate changes in vegetation cover and species' occurrence.

Species were classified as native ('natural' post-glacial invasion), archaeophytes (introduced up to 1500) and neophytes (introduced after 1500) (35-37, 51); 782 species, classified as native (n = 632 species), archaeophyte (n = 77 species) or neophyte (n = 73 species), were included in the analyses, representing the species that were sufficiently widespread and abundant in Britain to be recorded in the random CS main quadrats. We only considered higher plant species for which field recording was reliable and consistent between time periods. Therefore, we excluded from analysis a further 248 other higher plant 'species' because they were taxonomically ambiguous, leading to identification issues for field workers, or if there was ambiguity over the dates of arrival. Excluded 'species' included genus-only aggregates (n = 42), genus only records (n = 163), '*sensu latu*' records (n = 14), 'native hybrids' (n = 4), 'native aliens' for which part of their GB range was through introduction (n = 13), and 'alien hybrids' (n = 2). We also excluded marine species (n = 2) for which the survey plots were not appropriate, 'alien casuals' (n = 8) that are not thought to be naturalised, and two introduced species (*Mahonia japonica* and *Chenopodium quinoa*) whose classifications as neophytes or archaeophytes were uncertain.

Data analysis

The absolute changes in the frequency of occurrence (number of 1km^2 sites), and in the percentage cover (per quadrat per site, including zeros) of each species, between 1990 and 2007, were calculated. When calculating the latter, we included only those species that were recorded in at least 10 sites in both survey years (n = 217 species). To calculate mean percentage cover of each species (per quadrat per site) in 1990 and in 2007, we calculated the mean percentage cover per quadrat in each site (i.e. sum of percentage cover in a site divided by the number of quadrats in that site), summed these values, and then divided by the total number of sites surveyed in both years (n = 479 sites). We included the cover of the excluded species (aggregates etc., see previous section) and of bare ground as part of total cover, in the denominator. Absolute changes in the percentage cover and in the frequency of occurrence (number of sites) of each species were calculated by taking the values in 1990 from the values in 2007. Differences between native, archaeophyte and neophyte species in their percentage cover and in their frequency of occurrence were analysed using Kruskal-Wallis tests, given the non-normality of the response variables. Absolute change in the number of native species (max = 632) and the number of non-native species (max = 150, comprised of archaeophytes plus neophytes) recorded in each of the 479 sites between 1990 and 2007 was calculated; a generalised linear model was used to investigate the relationship between change in the diversity of native and of non-native species, using a 'TF' error distribution in GAMLSS package in R. All analysis was conducted using R (52).

Acknowledgments

The Countryside Survey is conducted by the Natural Environment Research Council (NERC) Centre for Ecology & Hydrology. The Countryside Survey of 2007 is funded by a partnership of nine government funded bodies led by NERC and the Department for Environment, Food and Rural Affairs (Defra). GP and CDT are supported by NERC grant NE/K00381X/1. Thanks to Kevin Walker (Botanical Society of the British Isles), Niall Moore (Non-native Species Secretariat for Great Britain) and two anonymous referees for helpful comments on the manuscript.

Footnotes

To whom correspondence should be addressed. Email: chris.thomas@york.ac.uk

Author contributions: CDT conceived study, CDT and GP designed research, GP and CDT performed research, GP analyzed data, and CDT and GP wrote the paper.

The authors declare no conflict of interest.

This article is a PNAS Direct Submission.

References

1. Global Invasive Species Database. http://www.issg.org/database/welcome/ (accessed 11 Sept 2014)
2. Mora C, Tittensor DP, Adl S, Simpson AGB (2011) How many species are there on earth and in the ocean? *PLoS Biol* 9:e1001127.
3. Zhang Z-Q, ed (2011) Animal biodiversity: an outline of higher-level classification and survey of taxonomic richness. *Zootaxa* 3148:1–237.
4. Zhang Z-Q, ed. (2013) Animal biodiversity: an outline of higher-level classification and survey of taxonomic richness (Addenda 2013). Zootaxa 3703:1–82.
5. Roy H *et al.* (2012) *Non-native species in Great Britain: establishment, detection and reporting to inform effective decision making. Appendix 5.* (Defra, London).
6. Roy, H.E. *et al.*(2014) GB Non-native Species Information Portal: documenting the arrival of non-native species in Britain. *Biol Invasions* 16(12):2495-2505.
7. Gurevitch J, Padilla DK (2004) Are invasive species a major cause of extinctions? *Trends Ecol Evol* 19(9):470–474.
8. Sax DF, Gaines SD, Brown JH (2002) Species invasions exceed extinctions on islands worldwide: a comparative study of plants and birds. *Am Nat* 160(6):766–783.
9. Sax DF, Gaines SD (2003) Species diversity: from global decreases to local increases. *Trends Ecol Evol* 18(11):561–566.
10. Pyšek P *et al.* (2012) A global assessment of invasive plant impacts on resident species, communities and ecosystems: the interaction of impact measures, invading species' traits and environment. *Glob Chang Biol* 18(5):1725–1737.
11. Pearman D, Walker K (2009) Alien plants in Britain, a real or imagined problem? *British Wildlife* 21:22–27.
12. Thomas CD (2013) Local diversity stays about the same, regional diversity increases, and global diversity declines. *Proc Natl Acad Sci USA* 110(48):19187–19188.
13. Savidge JA (1987) Extinction of an island forest avifauna by an introduced snake. *Ecology* 68(3):660–668.
14. Mack RN *et al.* (2000) Biotic invasions: causes, epidemiology, global consequences, and control. *Ecol Appl* 10(3):689–710.
15. Blackburn TM, Cassey P, Duncan RP, Evans L, Gaston KJ (2004) Avian extinction and mammalian introductions on oceanic islands. *Science* 305(5692):1955–1958.
16. Duncan RP, Boyer AG, Blackburn TM (2013) Magnitude and variation of prehistoric bird extinctions in the Pacific. *Proc Natl Acad Sci USA* 110(16):6436–6441.
17. McCallum H (2012) Disease and the dynamics of extinction. *Proc Biol Sci* 367(1604):2828–2839.
18. Atkinson CT, LaPointe DA (2009) Introduced avian diseases, climate change, and the future of Hawaiian honeycreepers. *J Avian Med Surg* 23(1):53–63.
19. Strauss A, White A, Boots M (2012) Invading with biological weapons: the importance of disease-mediated invasions. *Funct Ecol* 26(6):1249–1261.
20. Vitousek PM, Walker LR (1989) Biological invasion by *Myrica faya* in Hawai'i: plant demography, nitrogen fixation, ecosystem effects. *Ecol Monogr* 59(3):247–265.
21. Le Maitre DC *et al.* (2011) Impacts of invasive Australian acacias: implications for management and restoration. *Divers Distr* 17(5):1015–1029

22. Rundel PW, Dickie IA, Richardson DM (2014) Tree invasions into treeless areas: mechanisms and ecosystem processes. *Biol Invasions* 16(3):663–675.
23. Ricciardi A, Simberloff D (2009) Assisted colonization is not a viable conservation strategy. *Trends Ecol Evol* 24(5):248–253.
24. Essl F *et al*. (2011) Socioeconomic legacy yields an invasion debt. *Proc. Natl Acad Sci USA* 108(1):203–207.
25. Richardson DM, Ricciardi A (2013) Misleading criticisms of invasion science: a field guide. *Divers Distr* 19(12):1461–1467.
26. Simberloff D (2014) Biological invasions: what's worth fighting and what can be won? *Ecological Engineering* 65:112–121.
27. Sax DF, Gaines SD (2008) Species invasions and extinction: the future of native biodiversity on islands. *Proc Natl Acad Sci USA* 105(Suppl 1):11490–11497.
28. Powell KI, Chase JM, Knight TM (2011) A synthesis of plant invasion effects on biodiversity across spatial scales. *Am J Bot* 98(3):539–548.
29. Strong DR, Lawton JH, Southwood R (1984) *Insects on Plants* (Blackwell Scientific Publications, Oxford).
30. Anderson PK *et al.* (2004) Emerging infectious diseases of plants: pathogen pollution, climate change and agrotechnology drivers. *Trends Ecol Evol* 19(10):535–544.
31. Daehler CC (2003) Performance comparisons of co-occurring native and alien invasive plants: implications for conservation and restoration. *Annu Rev Ecol Evol Syst* 34:183–211.
32. Levine JM, Adler PB, Yelenik SG (2004) A meta-analysis of biotic resistance to exotic plant invasions. *Ecol Lett* 7(10):975–989.
33. Heard MJ, Sax DF (2013) Coexistence between native and exotic species is facilitated by asymmetries in competitive ability and susceptibility to herbivores. *Ecol Lett* 16(2):206–213.
34. Stohlgren TJ, Barnett DT, Kartesz JT (2003) The rich get richer: patterns of plant invasions in the United States. *Front Ecol Environ* 1(1):11-14.
35. Botham MS, Rothery P, Hulme PE, Hill MO, Preston CD, Roy DB (2009) Do urban areas act as foci for the spread of alien plant species? An assessment of temporal trends in the UK. *Divers Distrib* 15(2):338-345.
36. Preston CD, Pearman DA, Dines TD (2002) *New Atlas of the British & Irish flora* (Oxford University Press, Oxford).
37. de Albuquerque FS, Castro-Díez P, Rueda M, Hawkins BA, Rodríguez MÁ (2011) Relationships of climate, residence time, and biogeographical origin with the range sizes and species richness patterns of exotic plants in Great Britain. *Plant Ecol* 212(11):1901–1911.
38. Svenning JC, Skov F (2004) Limited filling of the potential range in European tree species. *Ecol Lett* 7(7):565–573.
39. Svenning JC, Skov F (2007) Ice age legacies in the geographical distribution of tree species richness in Europe. *Glob Ecol Biogeogr* 16(2):234-245.
40. Harrison SP, Prentice CI (2003) Climate and CO_2 controls on global vegetation distribution at the last glacial maximum: analysis based on palaeovegetation data, biome modelling and palaeoclimate simulations. *Glob Chang Biol* 9(7):983–1004.
41. Bartlein PJ *et al.* (2011) Pollen-based continental climate reconstructions at 6 and 21 ka: a global synthesis. *Clim Dyn* 37(3–4):775–802.
42. Tilman D (2011) Diversification, biotic interchange, and the universal trade-off hypothesis. *Am Nat* 178(3):355–371.
43. Pinto-Sánchez NR, Crawford AJ, Wiens JJ (2014) Using historical biogeography to test for community saturation. *Ecol Lett* 17(9):1077–1085.
44. Vitousek PM (1990) Biological invasions and ecosystem processes: towards an integration of population biology and ecosystem studies. *Oikos* 57(1):7–13.
45. Liao C *et al.* (2008) Altered ecosystem carbon and nitrogen cycles by plant invasion: a meta-analysis. New Phytol 177(3):706–714.
46. Maskell LC, Smart SM, Bullock, JM, Thompson K, Stevens CJ (2010) Nitrogen deposition causes widespread loss of species richness in British habitats. *Glob Chang Biol* 16(2):671–679.

47. Lim J, Crawley MJ, De Vere N, Rich T, Savolainen V (2014) A phylogenetic analysis of the British flora sheds light on the evolutionary and ecological factors driving plant invasions. *Ecol Evol* doi: 10.1002/ece3.1274
48. Doxford SW, Freckleton RP (2012) Changes in the large-scale distribution of plants: extinction, colonisation and the effects of climate. *J Ecol* 100(2):519–529.
49. Carey PD *et al.* (2008) *Countryside Survey: UK Results from 2007* (Centre for Ecology & Hydrology, Natural Environment Research Council, UK).
50. Maskell LC *et al.* (2008) *Countryside Survey. Vegetation Plots Handbook.* (Centre for Ecology & Hydrology, Natural Environment Research Council, UK).
51. Hulme PE (2009) Relative roles of life-form, land use and climate in recent dynamics of alien plant distributions in the British Isles. *Weed Res* 49(1):19-28.
52. R Core Team (2013) *R: A language and environment for statistical computing* (R Foundation for Statistical Computing, Vienna, Austria; www.R-project.org.).

Table 1. Kruskal-Wallis chi-squared tests comparing the number of, and changes in, percentage cover (per quadrat per site) and number of sites between native species, neophytes, and archaeophytes. Significant differences between groups are highlighted in bold; Bonferroni thresholds for p-values for 3-group comparisons and for pairwise comparisons were 0.025 (repeated tests in 1990 and 2007) and 0.0167 (three pairwise comparisons), respectively.

Response	Species groups	Test statistic
Number of sites (1990)	All groups	**$\chi 2$ (2) = 30.27, p < 0.0001**
	Native vs. neophyte	**$\chi 2$ (1) = 27.50, p < 0.0001**
	Native vs. archaeophyte	$\chi 2$ (1) = 4.50, p = 0.03
	Archaeophyte vs. neophyte	**$\chi 2$ (1) = 7.43, p = 0.006**
Number of sites (2007)	All groups	**$\chi 2$ (2) = 25.60, p < 0.0001**
	Native vs. neophyte	**$\chi 2$ (1) = 24.39, p < 0.0001**
	Native vs. archaeophyte	$\chi 2$ (1) = 2.04, p = 0.15
	Archaeophyte vs. neophyte	**$\chi 2$ (1) = 9.31, p = 0.002**
Cover (1990)	All groups	**$\chi 2$ (2) = 16.79, p < 0.001**
	Native vs. neophyte	$\chi 2$ (1) = 4.45, p = 0.03
	Native vs. archaeophyte	**$\chi 2$ (1) = 11.68, p < 0.001**
	Archaeophyte vs. neophyte	**$\chi 2$ (1) = 12.24, p < 0.001**
Cover (2007)	All groups	**$\chi 2$ (2) = 13.85, p < 0.001**
	Native vs. neophyte	**$\chi 2$ (1) = 6.52, p = 0.01**
	Native vs. archaeophyte	**$\chi 2$ (1) = 6.30, p = 0.01**
	Archaeophyte vs. neophyte	**$\chi 2$ (1) = 14.97, p < 0.001**
Change in number of sites	All groups	$\chi 2$ (2) = 4.29, p = 0.11
Change in cover	All groups	$\chi 2$ (2) = 2.44, p = 0.30

Figure 1. The number of sites (A) and mean percentage cover per site (B) of the most widespread (A) and most abundant (B) native species (white polygon with black outline), archaeophytes (grey bars) and neophytes (black bars), recorded during the Countryside Survey in 2007. In (A), 250 species (native = 221, archaeophytes = 21, neophytes = 8) are shown. In (B), 100 species (native = 92, archaeophytes = 2, neophytes = 6) are shown. Note that x-axes have been truncated: in (A), a further 427 species (native = 332, archaeophytes = 47, neophytes = 48) were recorded in Countryside Survey sites in 2007 – these species were all recorded in ≤ 11 sites; in (B), a further 171 species (native = 101, archaeophytes = 14, neophytes = 2) recorded in at least 10 sites had mean cover of over 0% in Countryside Survey sites in 2007 – mean cover of each of these species, per site, was ≤ 0.088%.

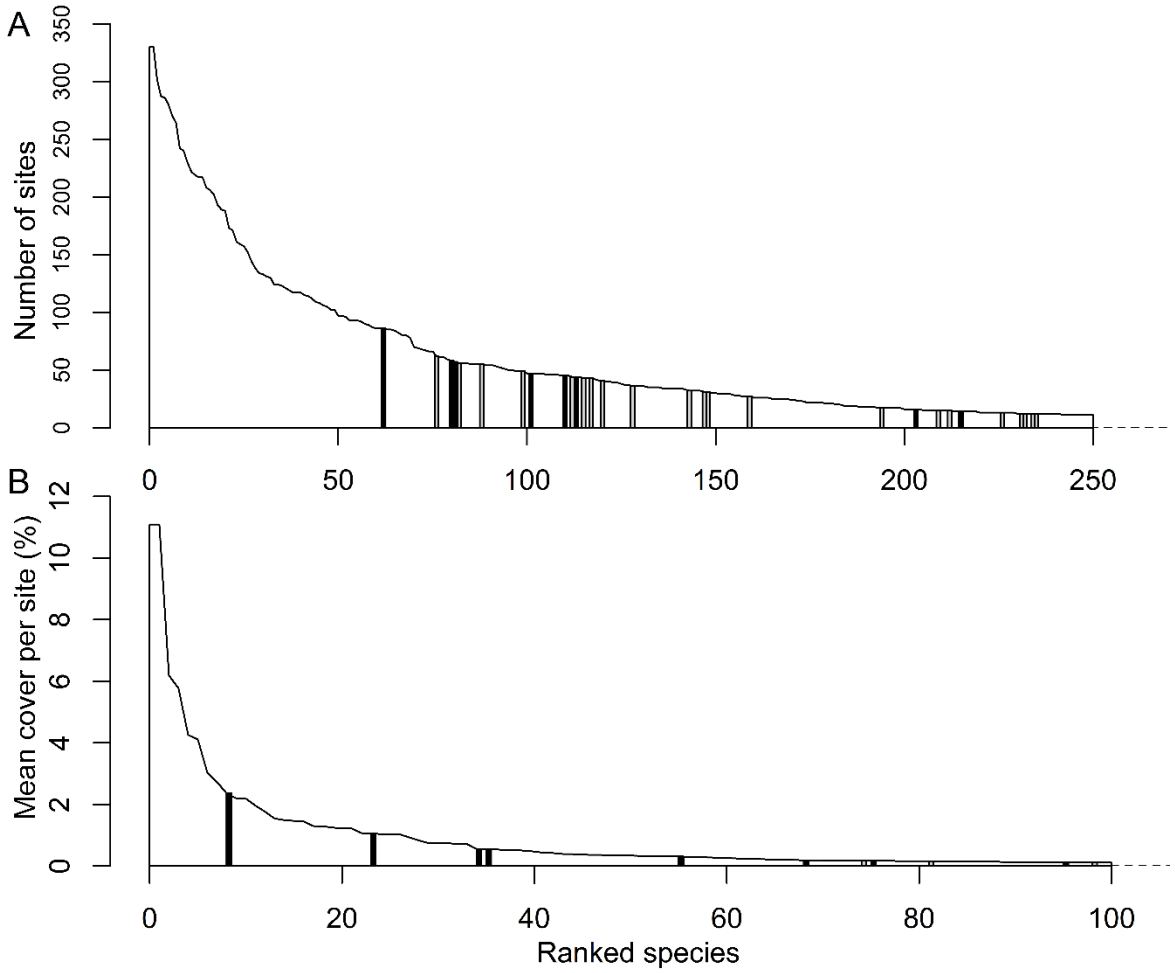


Figure 2. The frequency of occurrence (A) and mean percentage cover per site (B) of native species, archaeophytes and neophytes in 1990 (grey boxes, left hand box of each species group) and 2007 (white boxes, right hand box of each species group). Only species recorded in at least ten sites in each survey year are included in each panel. Sample sizes (numbers of species) are provided at the top of each box. Medians are represented by the horizontal black lines; the top and bottom of each box are the 75th and 25th percentiles, respectively; outliers are represented by hollow dots; and whiskers represent data within 1.5*inter-quartile range of the upper and lower quartiles.

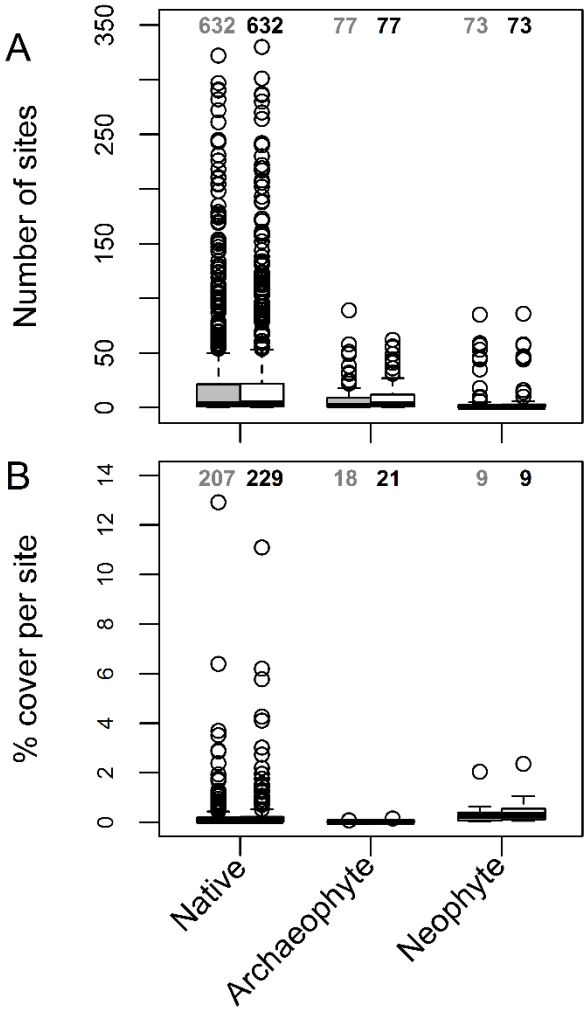


Figure 3. Changes in the frequency of occurrence (A) and mean percentage cover per site (B) of native species, archaeophytes and neophytes in 1990 (grey boxes, left hand box of each species group) and 2007 (white boxes, right hand box of each species group). Only species recorded in at least ten sites in both survey years are included in each panel. Sample sizes (numbers of species) are provided at the top of each box. Medians are represented by the horizontal black lines; the top and bottom of each box are the 75th and 25th percentiles, respectively; outliers are represented by hollow dots; and whiskers represent data within 1.5*inter-quartile range of the upper and lower quartiles.

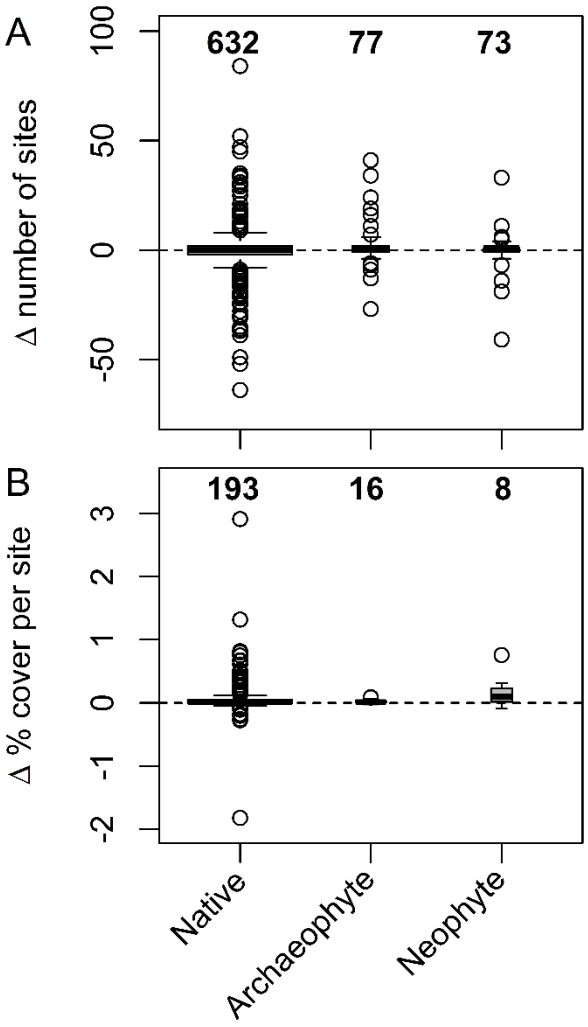
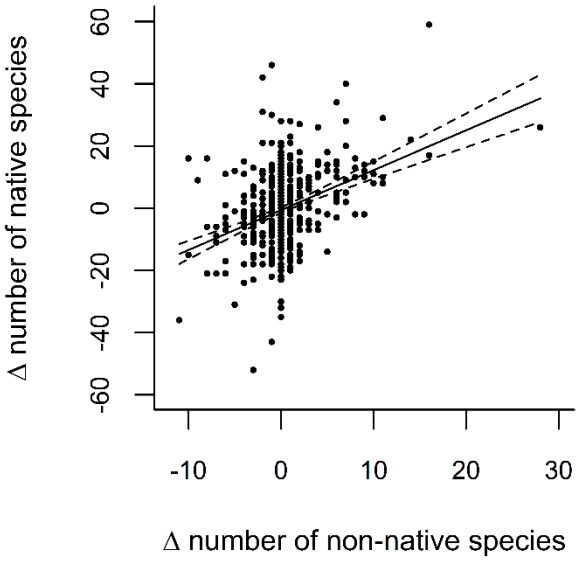


Figure 4. Changes in numbers of native plant species as a function of changes in the number of non-native plants species (comprised of neophytes plus archaeophytes) in Countryside Survey plots between 1990 and 2007. Each point represents a site (n = 479 sites). There was a significant positive relationship (line $\pm$ 95% CI) between changes in the diversity of native and non-native species ($y = -0.58 + 1.28x$, $R^2 = 0.14$, $p < 0.0001$).



Supplementary Information: C D Thomas and G Palmer: Non-native plants add to the British flora without negative consequences for native diversity.

Table S1. The median (interquartile range) number of, and changes in, percentage cover (per quadrat per site) and number of sites of native species, neophytes, and archaeophytes, before and after exclusion of 5 neophytes, which are actively planted for wood products (*P. sitchensis*, *P.abies*, *P. contorta*), vegetable oil (*B. napus*), and grass forage (*L. multiflorum*).

Response		Archaeophyte	Native	Neophyte
Number of sites (1990)	All species	2 (8)	3 (20.25)	1 (2.00)
	Minus managed species			1 (2.00)
Number of sites (2007)	All species	3 (11)	4 (21)	1 (2.00)
	Minus managed species			1 (2.25)
Cover (1990)	All species	0.02 (0.02)	0.06 (0.17)	0.26 (0.33)
	Minus managed species			0.05 (0.12)
Cover (2007)	All species	0.03 (0.04)	0.06 (0.20)	0.31 (0.43)
	Minus managed species			0.12 (0.10)
Change in number of sites	All species	1 (3)	0 (4)	1 (2.00)
	Minus managed species			1 (2.00)
Change in cover	All species	0.01 (0.03)	0.01 (0.05)	0.10 (0.16)
	Minus managed species			0.09 (0.11)

Table S2. Kruskal-Wallis chi-squared tests comparing the number of, and changes in, percentage cover (per quadrat per site) and number of sites between native species, neophytes, and archaeophytes, after exclusion of 5 neophytes, which are actively planted for wood products (*P. sitchensis*, *P.abies*, *P. contorta*), vegetable oil (*B. napus*), and grass forage (*L. multiflorum*). Significant differences between groups are highlighted in bold; Bonferroni thresholds for p-values for 3-group comparisons and for pairwise comparisons were 0.025 (repeated tests in 1990 and 2007) and 0.0167 (three pairwise comparisons), respectively.

Response	Species groups	Test statistic
Number of sites (1990)	All groups	**$\chi 2$ (2) = 39.44, p < 0.0001**
	Native vs. neophyte	**$\chi 2$ (1) = 36.72, p < 0.0001**
	Native vs. archaeophyte	$\chi 2$ (1) = 4.50, p = 0.03
	Archaeophyte vs. neophyte	**$\chi 2$ (1) = 12.32, p < 0.001**
Number of sites (2007)	All groups	**$\chi 2$ (2) = 32.87, p < 0.0001**
	Native vs. neophyte	**$\chi 2$ (1) = 31.58, p < 0.0001**
	Native vs. archaeophyte	$\chi 2$ (1) = 2.04, p = 0.15
	Archaeophyte vs. neophyte	**$\chi 2$ (1) = 13.97, p < 0.001**
Cover (1990)	All groups	**$\chi 2$ (2) = 11.90, p = 0.003**
	Native vs. neophyte	$\chi 2$ (1) = 0.04, p = 0.05
	Native vs. archaeophyte	**$\chi 2$ (1) = 11.68, p < 0.001**
	Archaeophyte vs. neophyte	$\chi 2$ (1) = 3.84, p = 0.05
Cover (2007)	All groups	**$\chi 2$ (2) = 8.14, p = 0.02**
	Native vs. neophyte	$\chi 2$ (1) = 1.27, p = 0.26
	Native vs. archaeophyte	**$\chi 2$ (1) = 6.30, p = 0.01**
	Archaeophyte vs. neophyte	**$\chi 2$ (1) = 8.01, p = 0.005**
Change in number of sites	All groups	$\chi 2$ (2) = 4.57, p = 0.10
Change in cover	All groups	$\chi 2$ (2) = 1.04, p = 0.60

Dataset S1. Number of sites and percentage cover per site for 782 species (native = 632, archaeophyte = 77, neophyte = 73) recorded in the Countryside Survey of 1990 and 2007. The absolute changes (i.e. values for 2007 minus values for 1990) in the number of sites and percentage cover per site of each species (for those which were present in at least ten sites in 1990 and in 2007) are also provided.

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Acer campestre*	24	11	15	4	0.02	0.03	0.01
Native	*Achillea millefolium*	174	150	119	-31	0.19	0.19	0.00
Native	*Achillea ptarmica*	38	29	19	-10	0.02	0.01	0.00
Native	*Adoxa moschatellina*	2	1	1	0	0.00	0.00	
Native	*Agrimonia eupatoria*	14	7	12	5	0.00	0.01	
Native	*Agrostis canina*	2	0	2	2	0.00	0.00	
Native	*Agrostis capillaris*	360	297	286	-11	3.69	4.11	0.42
Native	*Agrostis curtisii*	5	5	4	-1	0.05	0.03	
Native	*Agrostis stolonifera*	339	272	270	-2	1.93	2.73	0.80
Native	*Agrostis vinealis*	29	0	29	29	0.00	0.10	
Native	*Aira caryophyllea*	4	1	3	2	0.00	0.00	
Native	*Aira praecox*	44	36	22	-14	0.06	0.01	-0.05
Native	*Ajuga reptans*	32	20	19	-1	0.01	0.02	0.01
Native	*Alchemilla alpina*	8	8	7	-1	0.01	0.01	
Native	*Alchemilla vulgaris*	17	15	7	-8	0.01	0.00	
Native	*Alchemilla xanthochlora*	1	0	1	1	0.00	0.00	
Native	*Alliaria petiolata*	12	7	6	-1	0.00	0.00	
Native	*Allium ursinum*	2	1	2	1	0.00	0.00	
Native	*Allium vineale*	1	0	1	1	0.00	0.00	
Native	*Alnus glutinosa*	25	13	18	5	0.10	0.18	0.08
Native	*Alopecurus geniculatus*	72	43	45	2	0.04	0.10	0.06
Native	*Alopecurus pratensis*	102	78	61	-17	0.17	0.34	0.17
Native	*Ammophila arenaria*	5	4	4	0	0.04	0.04	
Native	*Anacamptis pyramidalis*	1	0	1	1	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Anagallis arvensis*	73	35	50	15	0.04	0.04	-0.01
Native	*Anagallis tenella*	18	15	9	-6	0.01	0.01	
Native	*Andromeda polifolia*	1	1	1	0	0.00	0.00	
Native	*Anemone nemorosa*	23	19	13	-6	0.01	0.01	0.00
Native	*Angelica sylvestris*	38	23	22	-1	0.02	0.03	0.01
Native	*Antennaria dioica*	8	7	4	-3	0.00	0.00	
Native	*Anthoxanthum odoratum*	271	226	230	4	1.17	1.54	0.37
Native	*Anthriscus caucalis*	1	1	0	-1	0.00	0.00	
Native	*Anthriscus sylvestris*	81	49	54	5	0.06	0.07	0.01
Native	*Anthyllis vulneraria*	4	3	2	-1	0.00	0.00	
Native	*Aphanes arvensis*	13	0	13	13	0.00	0.01	
Native	*Apium nodiflorum*	2	0	2	2	0.00	0.00	
Native	*Arabidopsis thaliana*	3	2	1	-1	0.00	0.02	
Native	*Arctostaphylos alpinus*	1	1	0	-1	0.00	0.00	
Native	*Arctostaphylos uva-ursi*	12	8	8	0	0.01	0.00	
Native	*Arenaria serpyllifolia*	5	2	3	1	0.00	0.00	
Native	*Armeria maritima*	12	9	11	2	0.01	0.02	
Native	*Arrhenatherum elatius*	136	75	109	34	0.22	1.04	0.82
Native	*Artemisia campestris*	1	1	0	-1	0.00	0.00	
Native	*Arum maculatum*	13	5	9	4	0.00	0.00	
Native	*Asparagus officinalis*	1	1	0	-1	0.00	0.00	
Native	*Asperula cynanchica*	5	3	5	2	0.00	0.00	
Native	*Aster tripolium*	6	4	5	1	0.03	0.01	
Native	*Athyrium filix-femina*	39	27	21	-6	0.03	0.04	0.01
Native	*Atriplex glabriuscula*	1	0	1	1	0.00	0.00	
Native	*Atriplex littoralis*	1	0	1	1	0.00	0.00	
Native	*Atriplex patula*	34	14	26	12	0.01	0.04	0.02

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Atriplex portulacoides*	4	1	4	3	0.08	0.05	
Native	*Atropa belladonna*	1	1	1	0	0.00	0.00	
Native	*Barbarea vulgaris*	2	0	2	2	0.00	0.00	
Native	*Bellis perennis*	201	175	123	-52	0.24	0.14	-0.10
Native	*Beta vulgaris*	27	22	15	-7	0.05	0.39	0.34
Native	*Beta vulgaris subsp.maritima*	3	0	3	3	0.00	0.01	
Native	*Betula pendula*	34	0	34	34	0.00	0.35	
Native	*Betula pubescens*	25	0	25	25	0.00	0.17	
Native	*Bidens cernua*	1	1	0	-1	0.00	0.00	
Native	*Blackstonia perfoliata*	4	3	3	0	0.00	0.00	
Native	*Blechnum spicant*	111	87	90	3	0.08	0.10	0.02
Native	*Botrychium lunaria*	2	2	0	-2	0.00	0.00	
Native	*Brachypodium pinnatum*	6	3	4	1	0.00	0.06	
Native	*Brachypodium sylvaticum*	38	27	29	2	0.07	0.09	0.02
Native	*Briza media*	15	13	6	-7	0.01	0.01	
Native	*Bromopsis erecta*	9	7	6	-1	0.03	0.05	
Native	*Bromopsis ramosa*	4	4	1	-3	0.00	0.00	
Native	*Bromus commutatus*	11	5	6	1	0.01	0.00	
Native	*Bromus hordeaceus*	82	48	54	6	0.12	0.13	0.01
Native	*Bromus racemosus*	6	0	6	6	0.00	0.01	
Native	*Bryonia dioica*	3	3	0	-3	0.00	0.00	
Native	*Buxus sempervirens*	2	2	0	-2	0.02	0.00	
Native	*Calamagrostis epigejos*	2	1	2	1	0.05	0.06	
Native	*Calluna vulgaris*	189	175	173	-2	6.39	6.19	-0.20
Native	*Caltha palustris*	13	10	7	-3	0.02	0.02	
Native	*Calystegia sepium*	18	7	13	6	0.00	0.01	
Native	*Calystegia soldanella*	1	0	1	1	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Campanula glomerata*	1	0	1	1	0.00	0.00	
Native	*Campanula rotundifolia*	50	40	35	-5	0.02	0.02	0.00
Native	*Campanula trachelium*	1	1	0	-1	0.00	0.00	
Native	*Cardamine amara*	4	1	3	2	0.00	0.00	
Native	*Cardamine flexuosa*	15	7	9	2	0.00	0.01	
Native	*Cardamine hirsuta*	2	0	2	2	0.00	0.00	
Native	*Cardamine impatiens*	1	0	1	1	0.00	0.00	
Native	*Cardamine pratensis*	114	76	82	6	0.05	0.06	0.01
Native	*Carduus crispus*	7	6	1	-5	0.01	0.00	
Native	*Carduus nutans*	7	4	3	-1	0.00	0.00	
Native	*Carex acuta*	1	0	1	1	0.00	0.00	
Native	*Carex acutiformis*	1	0	1	1	0.00	0.02	
Native	*Carex arenaria*	4	3	2	-1	0.01	0.01	
Native	*Carex bigelowii*	7	5	4	-1	0.00	0.01	
Native	*Carex binervis*	124	105	85	-20	0.14	0.18	0.04
Native	*Carex caryophyllea*	14	3	13	10	0.00	0.01	
Native	*Carex curta*	4	1	3	2	0.00	0.00	
Native	*Carex diandra*	1	1	0	-1	0.00	0.00	
Native	*Carex dioica*	9	6	6	0	0.00	0.00	
Native	*Carex disticha*	3	1	2	1	0.00	0.00	
Native	*Carex echinata*	124	94	93	-1	0.16	0.24	0.08
Native	*Carex flacca*	59	38	35	-3	0.04	0.06	0.02
Native	*Carex hirta*	23	14	17	3	0.01	0.05	0.04
Native	*Carex hostiana*	2	2	0	-2	0.00	0.00	
Native	*Carex humilis*	1	1	0	-1	0.00	0.00	
Native	*Carex laevigata*	1	1	0	-1	0.00	0.00	
Native	*Carex limosa*	2	2	0	-2	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Carex muricata*	2	2	0	-2	0.00	0.00	
Native	*Carex nigra*	130	106	85	-21	0.23	0.20	-0.04
Native	*Carex otrubae*	4	1	3	2	0.00	0.00	
Native	*Carex ovalis*	44	31	26	-5	0.02	0.03	0.01
Native	*Carex pallescens*	4	1	4	3	0.00	0.00	
Native	*Carex panicea*	137	113	114	1	0.28	0.29	0.01
Native	*Carex paniculata*	1	1	0	-1	0.00	0.00	
Native	*Carex pauciflora*	2	1	1	0	0.00	0.00	
Native	*Carex pendula*	6	1	6	5	0.00	0.00	
Native	*Carex pilulifera*	63	38	40	2	0.04	0.03	-0.01
Native	*Carex pulicaris*	36	28	20	-8	0.04	0.02	-0.02
Native	*Carex remota*	13	9	7	-2	0.02	0.02	
Native	*Carex riparia*	1	0	1	1	0.00	0.00	
Native	*Carex rostrata*	8	5	4	-1	0.02	0.03	
Native	*Carex spicata*	3	2	2	0	0.00	0.00	
Native	*Carex strigosa*	2	0	2	2	0.00	0.00	
Native	*Carex sylvatica*	12	9	6	-3	0.01	0.01	
Native	*Carex vesicaria*	2	1	2	1	0.00	0.01	
Native	*Carex viridula subsp.brachyrrhyncha*	7	2	5	3	0.00	0.00	
Native	*Carex viridula subsp.oedocarpa*	80	69	34	-35	0.09	0.04	-0.05
Native	*Carex viridula subsp.viridula*	1	0	1	1	0.00	0.00	
Native	*Carlina vulgaris*	3	1	2	1	0.00	0.00	
Native	*Carpinus betulus*	9	6	7	1	0.01	0.06	
Native	*Carum verticillatum*	1	1	0	-1	0.00	0.00	
Native	*Catabrosa aquatica*	1	1	0	-1	0.00	0.00	
Native	*Catapodium rigidum*	2	1	1	0	0.00	0.00	
Native	*Centaurea nigra*	72	57	43	-14	0.07	0.08	0.01

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Centaurea scabiosa*	5	4	2	-2	0.00	0.00	
Native	*Centaurium erythraea*	15	8	9	1	0.00	0.01	
Native	*Centaurium pulchellum*	1	0	1	1	0.00	0.00	
Native	*Cerastium arvense*	1	1	0	-1	0.00	0.00	
Native	*Cerastium fontanum*	294	245	264	19	0.29	0.36	0.07
Native	*Cerastium glomeratum*	38	21	18	-3	0.01	0.02	0.01
Native	*Cerastium pumilum*	1	0	1	1	0.00	0.00	
Native	*Cerastium semidecandrum*	3	3	0	-3	0.00	0.00	
Native	*Ceratocapnos claviculata*	3	3	0	-3	0.00	0.00	
Native	*Chaerophyllum temulum*	3	0	3	3	0.00	0.00	
Native	*Chamerion angustifolium*	81	55	47	-8	0.10	0.15	0.05
Native	*Chenopodium album*	130	104	55	-49	0.08	0.09	0.00
Native	*Chenopodium rubrum*	3	2	1	-1	0.00	0.00	
Native	*Chrysosplenium oppositifolium*	13	4	12	8	0.01	0.01	
Native	*Circaea lutetiana*	24	16	18	2	0.02	0.03	0.01
Native	*Cirsium acaule*	5	5	4	-1	0.01	0.01	
Native	*Cirsium arvense*	300	231	240	9	0.47	0.72	0.24
Native	*Cirsium dissectum*	1	0	1	1	0.00	0.00	
Native	*Cirsium eriophorum*	1	1	0	-1	0.00	0.00	
Native	*Cirsium heterophyllum*	2	1	1	0	0.00	0.00	
Native	*Cirsium palustre*	136	91	108	17	0.09	0.16	0.07
Native	*Cirsium vulgare*	278	198	189	-9	0.18	0.21	0.04
Native	*Clematis vitalba*	11	9	9	0	0.02	0.01	
Native	*Clinopodium vulgare*	4	1	4	3	0.00	0.01	
Native	*Cochlearia anglica*	1	0	1	1	0.00	0.00	
Native	*Coeloglossum viride*	1	1	0	-1	0.00	0.00	
Native	*Conopodium majus*	34	26	19	-7	0.01	0.02	0.01

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Convallaria majalis*	1	1	0	-1	0.00	0.00	
Native	*Convolvulus arvensis*	60	48	36	-12	0.08	0.05	-0.03
Native	*Cornus sanguinea*	10	2	10	8	0.00	0.01	
Native	*Cornus suecica*	3	2	3	1	0.00	0.00	
Native	*Corylus avellana*	49	32	38	6	0.30	0.34	0.04
Native	*Crataegus monogyna*	98	73	67	-6	0.20	0.23	0.02
Native	*Crepis biennis*	3	0	3	3	0.00	0.00	
Native	*Crepis capillaris*	36	12	25	13	0.01	0.02	0.02
Native	*Crepis paludosa*	4	1	3	2	0.00	0.00	
Native	*Crithmum maritimum*	1	1	1	0	0.00	0.00	
Native	*Cruciata laevipes*	7	3	7	4	0.00	0.02	
Native	*Cryptogramma crispa*	2	2	0	-2	0.00	0.00	
Native	*Cuscuta epithymum*	1	1	1	0	0.00	0.00	
Native	*Cynoglossum officinale*	2	1	2	1	0.00	0.00	
Native	*Cynosurus cristatus*	211	174	171	-3	0.95	1.30	0.35
Native	*Cystopteris fragilis*	1	1	0	-1	0.00	0.00	
Native	*Cytisus scoparius*	18	16	10	-6	0.03	0.05	0.02
Native	*Dactylis glomerata*	286	243	219	-24	1.05	1.25	0.20
Native	*Dactylorhiza fuchsii*	2	0	2	2	0.00	0.00	
Native	*Dactylorhiza maculata*	53	39	37	-2	0.03	0.07	0.04
Native	*Dactylorhiza majalis*	4	4	0	-4	0.00	0.00	
Native	*Dactylorhiza purpurella*	1	0	1	1	0.00	0.00	
Native	*Danthonia decumbens*	72	55	41	-14	0.04	0.05	0.01
Native	*Daucus carota*	20	11	16	5	0.01	0.02	0.01
Native	*Deschampsia cespitosa*	157	127	115	-12	0.51	0.71	0.20
Native	*Deschampsia flexuosa*	185	169	152	-17	1.14	1.22	0.09
Native	*Digitalis purpurea*	83	61	66	5	0.05	0.05	0.00

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Diphasiastrum alpinum*	10	8	6	-2	0.01	0.00	
Native	*Drosera intermedia*	13	7	9	2	0.00	0.01	
Native	*Drosera rotundifolia*	70	61	56	-5	0.06	0.06	0.00
Native	*Dryopteris aemula*	2	2	0	-2	0.00	0.00	
Native	*Dryopteris affinis*	22	6	17	11	0.01	0.05	
Native	*Dryopteris carthusiana*	6	1	5	4	0.00	0.00	
Native	*Dryopteris dilatata*	88	3	87	84	0.00	0.22	
Native	*Dryopteris expansa*	1	1	0	-1	0.00	0.00	
Native	*Dryopteris filix-mas*	83	49	55	6	0.06	0.09	0.03
Native	*Dryopteris remota*	1	0	1	1	0.00	0.00	
Native	*Echium vulgare*	4	2	2	0	0.00	0.00	
Native	*Eleocharis multicaulis*	5	1	4	3	0.00	0.01	
Native	*Eleocharis palustris*	9	5	5	0	0.00	0.01	
Native	*Eleocharis quinqueflora*	4	3	1	-2	0.01	0.00	
Native	*Eleocharis uniglumis*	6	6	0	-6	0.01	0.00	
Native	*Elymus caninus*	1	0	1	1	0.00	0.00	
Native	*Elytrigia atherica*	6	5	5	0	0.04	0.14	
Native	*Elytrigia juncea*	1	1	1	0	0.01	0.00	
Native	*Elytrigia repens*	177	144	80	-64	0.58	0.32	-0.26
Native	*Empetrum nigrum*	95	79	78	-1	0.25	0.33	0.08
Native	*Epilobium hirsutum*	50	19	36	17	0.03	0.03	0.00
Native	*Epilobium lanceolatum*	1	0	1	1	0.00	0.00	
Native	*Epilobium montanum*	55	34	27	-7	0.03	0.02	0.00
Native	*Epilobium obscurum*	13	3	11	8	0.00	0.04	
Native	*Epilobium palustre*	62	39	37	-2	0.02	0.02	0.00
Native	*Epilobium parviflorum*	23	1	22	21	0.00	0.03	
Native	*Epilobium tetragonum*	18	6	13	7	0.00	0.01	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Epipactis helleborine*	1	1	0	-1	0.00	0.00	
Native	*Equisetum arvense*	43	28	21	-7	0.02	0.03	0.01
Native	*Equisetum fluviatile*	10	5	6	1	0.01	0.01	
Native	*Equisetum palustre*	15	11	8	-3	0.01	0.01	
Native	*Equisetum pratense*	1	1	0	-1	0.00	0.00	
Native	*Equisetum sylvaticum*	5	2	4	2	0.00	0.00	
Native	*Equisetum telmateia*	1	0	1	1	0.00	0.00	
Native	*Erica cinerea*	124	112	93	-19	0.29	0.27	-0.02
Native	*Erica tetralix*	136	124	121	-3	0.57	0.52	-0.05
Native	*Eriophorum angustifolium*	125	119	112	-7	0.79	1.03	0.24
Native	*Eriophorum vaginatum*	123	110	102	-8	1.17	1.45	0.28
Native	*Erodium cicutarium*	6	5	4	-1	0.00	0.00	
Native	*Erodium maritimum*	1	0	1	1	0.00	0.00	
Native	*Euonymus europaeus*	5	2	4	2	0.00	0.00	
Native	*Eupatorium cannabinum*	7	3	6	3	0.00	0.01	
Native	*Euphorbia amygdaloides*	4	4	1	-3	0.00	0.00	
Native	*Euphorbia paralias*	1	0	1	1	0.00	0.00	
Native	*Euphrasia officinalis*	87	70	55	-15	0.05	0.05	0.00
Native	*Fagus sylvatica*	44	32	34	2	0.32	0.47	0.15
Native	*Festuca arundinacea*	27	17	17	0	0.10	0.08	-0.01
Native	*Festuca filiformis*	1	1	0	-1	0.00	0.00	
Native	*Festuca gigantea*	11	8	3	-5	0.00	0.00	
Native	*Festuca ovina agg.*	178	154	117	-37	1.14	0.93	-0.21
Native	*Festuca pratensis*	45	25	23	-2	0.06	0.06	0.00
Native	*Festuca rubra*	294	210	222	12	1.28	1.96	0.68
Native	*Festuca vivipara*	61	54	46	-8	0.15	0.11	-0.04
Native	*Filago minima*	2	1	1	0	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Filago vulgaris*	4	1	3	2	0.00	0.00	
Native	*Filipendula ulmaria*	46	35	34	-1	0.07	0.11	0.04
Native	*Filipendula vulgaris*	2	1	2	1	0.00	0.00	
Native	*Fragaria vesca*	11	7	4	-3	0.00	0.00	
Native	*Fraxinus excelsior*	109	70	86	16	0.36	0.83	0.48
Native	*Fumaria bastardii*	1	1	0	-1	0.00	0.00	
Native	*Fumaria capreolata*	2	2	0	-2	0.00	0.00	
Native	*Fumaria muralis*	1	0	1	1	0.00	0.00	
Native	*Galeopsis bifida*	1	0	1	1	0.00	0.00	
Native	*Galeopsis tetrahit*	35	25	15	-10	0.02	0.01	-0.01
Native	*Galium aparine*	171	101	134	33	0.14	0.18	0.05
Native	*Galium mollugo*	14	8	11	3	0.00	0.01	
Native	*Galium palustre*	61	39	46	7	0.03	0.03	0.00
Native	*Galium pumilum*	1	1	0	-1	0.00	0.00	
Native	*Galium saxatile*	196	185	157	-28	0.61	0.50	-0.11
Native	*Galium uliginosum*	7	4	3	-1	0.00	0.00	
Native	*Galium verum*	34	29	25	-4	0.03	0.03	0.00
Native	*Genista anglica*	4	4	1	-3	0.00	0.00	
Native	*Gentianella amarella*	2	1	2	1	0.00	0.00	
Native	*Gentianella campestris*	3	3	0	-3	0.00	0.00	
Native	*Geranium molle*	88	50	56	6	0.04	0.06	0.03
Native	*Geranium pratense*	6	3	3	0	0.00	0.00	
Native	*Geranium pusillum*	1	0	1	1	0.00	0.00	
Native	*Geranium robertianum*	39	24	29	5	0.02	0.02	0.00
Native	*Geranium sanguineum*	2	0	2	2	0.00	0.00	
Native	*Geum rivale*	5	4	1	-3	0.00	0.00	
Native	*Geum urbanum*	47	27	34	7	0.02	0.04	0.02

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Glaux maritima*	4	2	3	1	0.00	0.02	
Native	*Glechoma hederacea*	41	27	28	1	0.13	0.05	-0.08
Native	*Glyceria declinata*	4	0	4	4	0.00	0.00	
Native	*Glyceria fluitans*	14	5	10	5	0.00	0.04	
Native	*Glyceria maxima*	4	3	2	-1	0.00	0.00	
Native	*Glyceria notata*	1	0	1	1	0.00	0.00	
Native	*Gnaphalium supinum*	1	1	0	-1	0.00	0.00	
Native	*Gnaphalium uliginosum*	9	7	2	-5	0.00	0.00	
Native	*Goodyera repens*	1	1	0	-1	0.00	0.00	
Native	*Gymnocarpium dryopteris*	3	3	0	-3	0.00	0.00	
Native	*Hedera helix*	61	40	49	9	0.22	0.26	0.05
Native	*Helianthemum nummularium*	3	3	2	-1	0.00	0.00	
Native	*Helictotrichon pratense*	5	3	3	0	0.00	0.00	
Native	*Helictotrichon pubescens*	8	5	5	0	0.00	0.00	
Native	*Heracleum sphondylium*	127	73	89	16	0.09	0.10	0.00
Native	*Hippocrepis comosa*	2	1	2	1	0.00	0.00	
Native	*Holcus lanatus*	370	322	330	8	2.86	5.77	2.91
Native	*Holcus mollis*	124	98	59	-39	0.32	0.36	0.05
Native	*Honckenya peploides*	6	5	4	-1	0.00	0.00	
Native	*Hordeum secalinum*	17	13	13	0	0.11	0.10	-0.02
Native	*Huperzia selago*	37	25	25	0	0.03	0.02	-0.01
Native	*Hyacinthoides non-scripta*	57	40	40	0	0.08	0.08	0.00
Native	*Hydrocotyle vulgaris*	17	17	9	-8	0.02	0.02	
Native	*Hypericum hirsutum*	7	3	5	2	0.00	0.00	
Native	*Hypericum humifusum*	10	7	4	-3	0.00	0.00	
Native	*Hypericum maculatum*	6	3	3	0	0.00	0.00	
Native	*Hypericum montanum*	1	1	0	-1	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Hypericum perforatum*	15	8	9	1	0.01	0.00	
Native	*Hypericum pulchrum*	45	35	26	-9	0.02	0.02	-0.01
Native	*Hypericum tetrapterum*	5	1	4	3	0.00	0.00	
Native	*Hypochaeris glabra*	3	1	2	1	0.00	0.00	
Native	*Hypochaeris radicata*	98	57	68	11	0.06	0.08	0.01
Native	*Ilex aquifolium*	58	32	50	18	0.08	0.20	0.11
Native	*Inula crithmoides*	1	0	1	1	0.00	0.00	
Native	*Iris foetidissima*	2	0	2	2	0.00	0.00	
Native	*Iris pseudacorus*	7	7	3	-4	0.01	0.01	
Native	*Isolepis setacea*	3	0	3	3	0.00	0.00	
Native	*Jasione montana*	4	4	1	-3	0.00	0.00	
Native	*Juncus balticus*	1	0	1	1	0.00	0.00	
Native	*Juncus bulbosus*	90	77	49	-28	0.08	0.06	-0.02
Native	*Juncus compressus*	1	0	1	1	0.00	0.00	
Native	*Juncus conglomeratus*	82	46	51	5	0.06	0.13	0.06
Native	*Juncus effusus*	234	179	206	27	0.86	1.47	0.61
Native	*Juncus gerardii*	2	1	2	1	0.00	0.00	
Native	*Juncus inflexus*	21	6	17	11	0.00	0.02	
Native	*Juncus maritimus*	2	2	0	-2	0.00	0.00	
Native	*Juncus squarrosus*	143	134	124	-10	0.72	0.74	0.02
Native	*Juncus trifidus*	2	2	1	-1	0.01	0.03	
Native	*Juniperus communis*	7	6	3	-3	0.00	0.01	
Native	*Knautia arvensis*	4	2	2	0	0.00	0.00	
Native	*Koeleria macrantha*	8	5	4	-1	0.01	0.00	
Native	*Lamiastrum galeobdolon*	12	10	5	-5	0.02	0.02	
Native	*Lathyrus linifolius*	16	15	4	-11	0.01	0.00	
Native	*Lathyrus nissolia*	3	1	3	2	0.01	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Lathyrus pratensis*	67	38	46	8	0.03	0.03	0.01
Native	*Lavatera arborea*	1	0	1	1	0.00	0.00	
Native	*Lemna minor*	2	0	2	2	0.00	0.00	
Native	*Leontodon autumnalis*	110	63	66	3	0.04	0.07	0.03
Native	*Leontodon hispidus*	32	8	26	18	0.01	0.04	
Native	*Leontodon saxatilis*	7	1	6	5	0.00	0.01	
Native	*Lepidium heterophyllum*	1	1	0	-1	0.00	0.00	
Native	*Leucanthemum vulgare*	20	12	10	-2	0.01	0.01	0.00
Native	*Leymus arenarius*	1	0	1	1	0.00	0.01	
Native	*Ligustrum vulgare*	6	5	4	-1	0.02	0.03	
Native	*Limonium humile*	1	1	0	-1	0.00	0.00	
Native	*Limonium vulgare*	3	1	2	1	0.00	0.00	
Native	*Linaria vulgaris*	5	3	3	0	0.00	0.00	
Native	*Linum bienne*	2	0	2	2	0.00	0.00	
Native	*Linum catharticum*	21	16	10	-6	0.01	0.01	0.00
Native	*Listera cordata*	26	18	14	-4	0.01	0.01	-0.01
Native	*Listera ovata*	2	2	1	-1	0.00	0.00	
Native	*Lithospermum officinale*	1	0	1	1	0.00	0.00	
Native	*Littorella uniflora*	3	3	0	-3	0.00	0.00	
Native	*Lobelia dortmanna*	1	1	0	-1	0.00	0.00	
Native	*Loiseleuria procumbens*	2	2	1	-1	0.00	0.00	
Native	*Lolium perenne*	316	290	287	-3	12.91	11.09	-1.82
Native	*Lonicera periclymenum*	38	34	27	-7	0.06	0.05	-0.02
Native	*Lotus corniculatus*	126	93	96	3	0.09	0.12	0.03
Native	*Lotus glaber*	1	0	1	1	0.00	0.00	
Native	*Lotus pedunculatus*	61	38	44	6	0.04	0.05	0.01
Native	*Lotus subbiflorus*	2	2	0	-2	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Luzula pilosa*	23	17	11	-6	0.01	0.01	0.00
Native	*Luzula spicata*	1	1	0	-1	0.00	0.00	
Native	*Luzula sylvatica*	45	32	28	-4	0.09	0.10	0.02
Native	*Lychnis flos-cuculi*	18	12	12	0	0.01	0.01	0.00
Native	*Lycopodium clavatum*	3	2	2	0	0.00	0.00	
Native	*Lycopus europaeus*	3	1	2	1	0.00	0.00	
Native	*Lysimachia nemorum*	32	22	15	-7	0.01	0.01	0.00
Native	*Lysimachia nummularia*	8	2	6	4	0.00	0.00	
Native	*Lysimachia vulgaris*	1	0	1	1	0.00	0.00	
Native	*Lythrum portula*	1	0	1	1	0.00	0.00	
Native	*Lythrum salicaria*	2	2	0	-2	0.00	0.00	
Native	*Malus sylvestris*	3	3	0	-3	0.01	0.00	
Native	*Malva moschata*	1	0	1	1	0.00	0.00	
Native	*Medicago arabica*	2	0	2	2	0.00	0.00	
Native	*Medicago lupulina*	37	18	24	6	0.02	0.03	0.01
Native	*Medicago sativa*	4	3	1	-2	0.03	0.03	
Native	*Melampyrum pratense*	7	5	4	-1	0.00	0.00	
Native	*Melampyrum sylvaticum*	1	0	1	1	0.00	0.00	
Native	*Melica uniflora*	3	2	2	0	0.00	0.00	
Native	*Mentha aquatica*	10	6	6	0	0.01	0.00	
Native	*Mentha arvensis*	2	1	1	0	0.00	0.00	
Native	*Menyanthes trifoliata*	6	5	4	-1	0.00	0.00	
Native	*Mercurialis perennis*	23	22	17	-5	0.19	0.17	-0.03
Native	*Milium effusum*	3	2	2	0	0.00	0.00	
Native	*Moehringia trinervia*	9	6	5	-1	0.00	0.00	
Native	*Molinia caerulea*	158	147	144	-3	3.51	4.26	0.75
Native	*Montia fontana*	24	11	18	7	0.01	0.01	0.00

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Myosotis discolor*	9	5	4	-1	0.00	0.00	
Native	*Myosotis laxa*	6	4	2	-2	0.00	0.00	
Native	*Myosotis scorpioides*	7	6	2	-4	0.00	0.00	
Native	*Myosotis secunda*	2	0	2	2	0.00	0.00	
Native	*Myosoton aquaticum*	1	1	0	-1	0.00	0.00	
Native	*Myrica gale*	41	38	35	-3	0.21	0.25	0.04
Native	*Nardus stricta*	157	143	130	-13	1.77	1.49	-0.28
Native	*Narthecium ossifragum*	102	98	92	-6	0.20	0.32	0.12
Native	*Odontites vernus*	17	9	14	5	0.01	0.03	
Native	*Oenanthe crocata*	5	0	5	5	0.00	0.01	
Native	*Ononis repens*	4	1	4	3	0.00	0.00	
Native	*Ononis spinosa*	1	1	1	0	0.00	0.00	
Native	*Ophioglossum vulgatum*	5	2	4	2	0.00	0.00	
Native	*Ophrys apifera*	1	1	0	-1	0.00	0.00	
Native	*Orchis mascula*	2	1	1	0	0.00	0.00	
Native	*Oreopteris limbosperma*	23	15	16	1	0.01	0.01	0.00
Native	*Origanum vulgare*	2	2	1	-1	0.02	0.02	
Native	*Ornithopus perpusillus*	4	4	2	-2	0.00	0.01	
Native	*Orobanche minor*	1	1	0	-1	0.00	0.00	
Native	*Oxalis acetosella*	78	65	61	-4	0.14	0.15	0.01
Native	*Parapholis strigosa*	2	0	2	2	0.00	0.00	
Native	*Parietaria judaica*	1	0	1	1	0.00	0.00	
Native	*Parnassia palustris*	5	4	2	-2	0.00	0.00	
Native	*Pastinaca sativa*	8	2	7	5	0.00	0.05	
Native	*Pedicularis palustris*	13	4	9	5	0.00	0.01	
Native	*Pedicularis sylvatica*	76	64	54	-10	0.06	0.07	0.02
Native	*Persicaria amphibia*	8	5	3	-2	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Persicaria bistorta*	1	0	1	1	0.00	0.01	
Native	*Persicaria hydropiper*	9	8	1	-7	0.00	0.00	
Native	*Persicaria maculosa*	94	59	53	-6	0.03	0.06	0.03
Native	*Persicaria vivipara*	3	2	1	-1	0.00	0.00	
Native	*Petasites hybridus*	6	2	4	2	0.01	0.00	
Native	*Petroselinum segetum*	2	2	0	-2	0.00	0.00	
Native	*Phalaris arundinacea*	12	5	9	4	0.00	0.02	
Native	*Phegopteris connectilis*	6	5	1	-4	0.00	0.00	
Native	*Phleum bertolonii*	33	14	25	11	0.03	0.11	0.08
Native	*Phragmites australis*	3	1	3	2	0.04	0.07	
Native	*Phyllitis scolopendrium*	9	5	7	2	0.01	0.02	
Native	*Phyteuma orbiculare*	2	2	1	-1	0.00	0.00	
Native	*Picris hieracioides*	3	0	3	3	0.00	0.00	
Native	*Pilosella officinarum*	33	24	17	-7	0.01	0.02	0.00
Native	*Pimpinella saxifraga*	13	9	9	0	0.00	0.01	
Native	*Pinguicula lusitanica*	10	4	7	3	0.00	0.00	
Native	*Pinguicula vulgaris*	57	46	47	1	0.04	0.04	-0.01
Native	*Pinus sylvestris*	41	34	30	-4	0.70	0.52	-0.18
Native	*Plantago coronopus*	15	14	8	-6	0.02	0.02	
Native	*Plantago lanceolata*	219	169	159	-10	0.28	0.31	0.04
Native	*Plantago major*	213	153	138	-15	0.11	0.11	0.00
Native	*Plantago maritima*	30	26	21	-5	0.05	0.04	-0.01
Native	*Plantago media*	11	5	9	4	0.00	0.00	
Native	*Poa angustifolia*	1	0	1	1	0.00	0.01	
Native	*Poa annua*	324	261	242	-19	0.65	1.03	0.37
Native	*Poa compressa*	4	1	3	2	0.00	0.01	
Native	*Poa humilis*	3	0	3	3	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Poa nemoralis*	18	9	10	1	0.04	0.02	
Native	*Poa trivialis*	280	170	217	47	0.44	1.76	1.32
Native	*Polygala calcarea*	1	1	0	-1	0.00	0.00	
Native	*Polygonatum multiflorum*	1	1	1	0	0.00	0.00	
Native	*Polygonum aviculare*	176	129	93	-36	0.11	0.16	0.05
Native	*Polygonum nodosum*	7	4	3	-1	0.00	0.00	
Native	*Polystichum aculeatum*	3	2	1	-1	0.00	0.00	
Native	*Polystichum setiferum*	5	1	5	4	0.00	0.00	
Native	*Populus tremula*	3	0	3	3	0.00	0.02	
Native	*Potamogeton natans*	3	0	3	3	0.00	0.00	
Native	*Potamogeton polygonifolius*	12	4	11	7	0.00	0.03	
Native	*Potentilla anglica*	5	3	2	-1	0.00	0.00	
Native	*Potentilla anserina*	42	33	23	-10	0.08	0.08	0.00
Native	*Potentilla erecta*	222	204	193	-11	0.46	0.54	0.07
Native	*Potentilla palustris*	10	9	6	-3	0.01	0.01	
Native	*Potentilla reptans*	63	46	34	-12	0.03	0.03	0.00
Native	*Potentilla sterilis*	26	18	12	-6	0.01	0.01	0.00
Native	*Primula veris*	10	4	8	4	0.00	0.00	
Native	*Primula vulgaris*	35	31	14	-17	0.02	0.01	-0.01
Native	*Prunella vulgaris*	175	130	124	-6	0.12	0.12	0.00
Native	*Prunus avium*	16	4	12	8	0.01	0.03	
Native	*Prunus padus*	2	1	1	0	0.00	0.00	
Native	*Prunus spinosa*	40	16	29	13	0.03	0.04	0.01
Native	*Pteridium aquilinum*	132	113	117	4	2.39	2.19	-0.20
Native	*Puccinellia maritima*	4	3	3	0	0.13	0.12	
Native	*Pulicaria dysenterica*	13	5	11	6	0.00	0.06	
Native	*Quercus petraea*	16	0	16	16	0.00	0.39	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Quercus robur*	52	0	52	52	0.00	0.74	
Native	*Ranunculus acris*	210	151	161	10	0.17	0.37	0.20
Native	*Ranunculus bulbosus*	58	38	32	-6	0.04	0.04	0.00
Native	*Ranunculus ficaria*	12	7	7	0	0.01	0.01	
Native	*Ranunculus flammula*	71	49	46	-3	0.03	0.03	0.00
Native	*Ranunculus lingua*	2	0	2	2	0.00	0.00	
Native	*Ranunculus omiophyllus*	1	0	1	1	0.00	0.00	
Native	*Ranunculus parviflorus*	1	0	1	1	0.00	0.00	
Native	*Ranunculus repens*	319	282	280	-2	0.63	1.29	0.67
Native	*Ranunculus sceleratus*	2	1	1	0	0.00	0.00	
Native	*Raphanus raphanistrum*	15	3	12	9	0.00	0.04	
Native	*Raphanus raphanistrum subsp.maritimus*	1	1	0	-1	0.00	0.00	
Native	*Rhamnus cathartica*	1	0	1	1	0.00	0.00	
Native	*Rhinanthus minor*	11	0	11	11	0.00	0.02	
Native	*Rhynchospora alba*	9	7	7	0	0.01	0.06	
Native	*Rorippa islandica*	1	1	0	-1	0.00	0.00	
Native	*Rorippa nasturtium-aquaticum*	2	1	1	0	0.00	0.00	
Native	*Rorippa palustris*	1	1	0	-1	0.00	0.00	
Native	*Rosa arvensis*	4	0	4	4	0.00	0.01	
Native	*Rosa canina*	13	0	13	13	0.00	0.01	
Native	*Rubia peregrina*	2	1	1	0	0.00	0.00	
Native	*Rubus caesius*	4	1	3	2	0.00	0.00	
Native	*Rubus chamaemorus*	18	14	14	0	0.04	0.04	0.00
Native	*Rubus fruticosus*	148	101	131	30	0.67	1.07	0.40
Native	*Rubus idaeus*	24	14	15	1	0.01	0.03	0.02
Native	*Rumex acetosa*	248	211	208	-3	0.33	0.43	0.09
Native	*Rumex acetosella*	86	69	47	-22	0.07	0.09	0.02

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Rumex crispus*	147	111	86	-25	0.08	0.09	0.01
Native	*Rumex longifolius*	1	0	1	1	0.00	0.00	
Native	*Rumex maritimus*	1	1	0	-1	0.00	0.00	
Native	*Rumex obtusifolius*	264	205	217	12	0.25	0.42	0.17
Native	*Rumex pulcher*	4	2	2	0	0.00	0.00	
Native	*Rumex rupestris*	1	0	1	1	0.00	0.00	
Native	*Ruscus aculeatus*	2	0	2	2	0.00	0.00	
Native	*Sagina apetala*	2	0	2	2	0.00	0.00	
Native	*Sagina procumbens*	2	0	2	2	0.00	0.00	
Native	*Salix atrocinerea*	3	3	0	-3	0.05	0.00	
Native	*Salix aurita*	11	9	3	-6	0.02	0.01	
Native	*Salix caprea*	18	8	11	3	0.01	0.03	
Native	*Salix cinerea*	14	4	10	6	0.01	0.01	
Native	*Salix herbacea*	2	2	1	-1	0.01	0.00	
Native	*Salix reticulata*	2	1	1	0	0.00	0.00	
Native	*Sambucus nigra*	52	35	36	1	0.13	0.13	0.00
Native	*Samolus valerandi*	1	1	1	0	0.00	0.00	
Native	*Sanguisorba major*	2	2	1	-1	0.00	0.00	
Native	*Sanguisorba minor*	11	9	9	0	0.03	0.02	
Native	*Sanicula europaea*	3	3	1	-2	0.00	0.00	
Native	*Sarcocornia perennis*	1	1	0	-1	0.00	0.00	
Native	*Saxifraga aizoides*	3	2	1	-1	0.00	0.00	
Native	*Saxifraga hypnoides*	1	1	0	-1	0.00	0.00	
Native	*Saxifraga oppositifolia*	2	2	0	-2	0.00	0.00	
Native	*Scabiosa columbaria*	5	2	4	2	0.00	0.00	
Native	*Schoenus nigricans*	15	13	13	0	0.02	0.02	0.00
Native	*Scilla autumnalis*	1	0	1	1	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Scilla verna*	4	1	4	3	0.00	0.00	
Native	*Scrophularia auriculata*	1	1	0	-1	0.00	0.00	
Native	*Scrophularia nodosa*	7	3	4	1	0.00	0.00	
Native	*Scutellaria galericulata*	2	1	1	0	0.01	0.00	
Native	*Scutellaria minor*	8	6	5	-1	0.00	0.00	
Native	*Sedum acre*	2	2	0	-2	0.00	0.00	
Native	*Sedum anglicum*	13	11	8	-3	0.01	0.01	
Native	*Sedum rosea*	1	1	0	-1	0.00	0.00	
Native	*Selaginella selaginoides*	31	22	15	-7	0.01	0.01	0.00
Native	*Senecio aquaticus*	8	5	4	-1	0.00	0.00	
Native	*Senecio erucifolius*	13	3	12	9	0.00	0.02	
Native	*Senecio jacobaea*	159	100	106	6	0.08	0.11	0.03
Native	*Senecio sylvaticus*	7	3	4	1	0.00	0.00	
Native	*Senecio vulgaris*	137	66	97	31	0.04	0.16	0.11
Native	*Seriphidium maritimum*	1	1	0	-1	0.00	0.00	
Native	*Serratula tinctoria*	1	1	0	-1	0.00	0.00	
Native	*Sesleria caerulea*	2	2	0	-2	0.00	0.00	
Native	*Sherardia arvensis*	18	9	14	5	0.01	0.02	
Native	*Silaum silaus*	2	2	0	-2	0.00	0.00	
Native	*Silene acaulis*	1	0	1	1	0.00	0.00	
Native	*Silene dioica*	34	28	22	-6	0.03	0.03	0.01
Native	*Silene uniflora*	2	2	2	0	0.00	0.00	
Native	*Silene vulgaris*	4	1	3	2	0.00	0.00	
Native	*Sison amomum*	3	0	3	3	0.00	0.02	
Native	*Solanum dulcamara*	11	0	11	11	0.00	0.01	
Native	*Solidago virgaurea*	5	2	3	1	0.00	0.00	
Native	*Sonchus arvensis*	34	13	24	11	0.01	0.03	0.02

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Sonchus asper*	134	57	102	45	0.03	0.14	0.10
Native	*Sonchus oleraceus*	99	59	47	-12	0.03	0.04	0.01
Native	*Sonchus palustris*	2	0	2	2	0.00	0.00	
Native	*Sorbus aria*	1	1	0	-1	0.00	0.00	
Native	*Sorbus aucuparia*	96	63	70	7	0.09	0.12	0.04
Native	*Sorbus torminalis*	1	1	1	0	0.01	0.02	
Native	*Sparganium angustifolium*	1	0	1	1	0.00	0.00	
Native	*Spartina anglica*	1	0	1	1	0.00	0.01	
Native	*Spergula arvensis*	1	0	1	1	0.00	0.01	
Native	*Spergularia marina*	4	3	2	-1	0.00	0.00	
Native	*Spergularia media*	3	1	2	1	0.00	0.00	
Native	*Spergularia rubra*	1	1	0	-1	0.00	0.00	
Native	*Spergularia rupicola*	1	0	1	1	0.00	0.00	
Native	*Stachys officinalis*	9	8	2	-6	0.00	0.00	
Native	*Stachys palustris*	3	2	1	-1	0.00	0.00	
Native	*Stachys sylvatica*	35	27	12	-15	0.02	0.02	0.00
Native	*Stellaria graminea*	57	28	39	11	0.02	0.03	0.00
Native	*Stellaria holostea*	23	13	16	3	0.01	0.02	0.01
Native	*Stellaria media*	280	218	188	-30	0.29	0.28	0.00
Native	*Stellaria nemorum*	1	1	0	-1	0.00	0.00	
Native	*Stellaria palustris*	4	3	1	-2	0.00	0.00	
Native	*Stellaria uliginosa*	62	36	39	3	0.04	0.03	0.00
Native	*Suaeda maritima*	5	3	2	-1	0.01	0.00	
Native	*Suaeda vera*	1	0	1	1	0.00	0.00	
Native	*Succisa pratensis*	101	87	84	-3	0.12	0.14	0.02
Native	*Symphytum officinale*	3	2	2	0	0.01	0.00	
Native	*Tamus communis*	13	7	9	2	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Tanacetum vulgare*	1	0	1	1	0.00	0.00	
Native	*Taxus baccata*	7	3	7	4	0.04	0.08	
Native	*Teucrium scorodonia*	40	31	26	-5	0.04	0.03	-0.01
Native	*Thalictrum alpinum*	3	2	2	0	0.00	0.00	
Native	*Thalictrum minus*	5	3	3	0	0.00	0.00	
Native	*Thesium humifusum*	1	1	0	-1	0.00	0.00	
Native	*Thymus polytrichus*	47	42	30	-12	0.05	0.04	-0.01
Native	*Thymus serpyllum*	1	1	0	-1	0.00	0.00	
Native	*Tilia cordata*	2	1	1	0	0.01	0.00	
Native	*Tilia platyphyllos*	2	0	2	2	0.00	0.01	
Native	*Tofieldia pusilla*	1	0	1	1	0.00	0.00	
Native	*Torilis japonica*	17	9	11	2	0.02	0.00	
Native	*Torilis nodosa*	1	1	1	0	0.01	0.00	
Native	*Tragopogon pratensis*	7	5	3	-2	0.00	0.00	
Native	*Trichophorum cespitosum*	119	109	105	-4	1.69	2.20	0.51
Native	*Trientalis europaea*	21	11	20	9	0.01	0.01	0.00
Native	*Trifolium arvense*	1	0	1	1	0.00	0.01	
Native	*Trifolium campestre*	10	5	6	1	0.01	0.01	
Native	*Trifolium dubium*	62	30	42	12	0.02	0.04	0.02
Native	*Trifolium incarnatum*	1	1	0	-1	0.00	0.00	
Native	*Trifolium medium*	7	5	2	-3	0.00	0.01	
Native	*Trifolium micranthum*	5	2	3	1	0.00	0.00	
Native	*Trifolium pratense*	170	123	117	-6	0.16	0.19	0.03
Native	*Trifolium repens*	327	291	301	10	2.90	3.02	0.11
Native	*Trifolium striatum*	1	1	0	-1	0.00	0.00	
Native	*Triglochin maritimum*	6	3	5	2	0.00	0.01	
Native	*Triglochin palustre*	10	10	1	-9	0.01	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Trisetum flavescens*	29	13	22	9	0.02	0.05	0.03
Native	*Tussilago farfara*	17	12	9	-3	0.01	0.00	
Native	*Typha latifolia*	1	0	1	1	0.00	0.00	
Native	*Ulex europaeus*	45	32	32	0	0.19	0.28	0.09
Native	*Ulex gallii*	18	10	14	4	0.12	0.15	0.04
Native	*Ulmus glabra*	5	0	5	5	0.00	0.03	
Native	*Umbilicus rupestris*	3	2	2	0	0.00	0.00	
Native	*Urtica dioica*	259	177	202	25	0.41	0.74	0.33
Native	*Utricularia minor*	3	3	0	-3	0.00	0.00	
Native	*Vaccinium myrtillus*	144	134	133	-1	0.80	1.22	0.42
Native	*Vaccinium oxycoccos*	8	6	6	0	0.00	0.01	
Native	*Vaccinium uliginosum*	1	1	1	0	0.00	0.00	
Native	*Vaccinium vitis-idaea*	38	29	32	3	0.04	0.12	0.08
Native	*Valeriana officinalis*	12	7	7	0	0.00	0.01	
Native	*Verbascum thapsus*	1	1	0	-1	0.00	0.00	
Native	*Veronica arvensis*	95	61	45	-16	0.04	0.03	-0.01
Native	*Veronica beccabunga*	7	5	3	-2	0.00	0.00	
Native	*Veronica chamaedrys*	139	96	97	1	0.06	0.09	0.03
Native	*Veronica montana*	33	23	13	-10	0.01	0.02	0.01
Native	*Veronica officinalis*	57	41	33	-8	0.02	0.02	-0.01
Native	*Veronica scutellata*	2	1	1	0	0.00	0.00	
Native	*Veronica serpyllifolia*	126	79	80	1	0.05	0.04	0.00
Native	*Viburnum lantana*	2	1	1	0	0.00	0.00	
Native	*Viburnum opulus*	4	2	2	0	0.01	0.00	
Native	*Vicia cracca*	28	18	18	0	0.02	0.02	0.00
Native	*Vicia hirsuta*	6	4	3	-1	0.00	0.00	
Native	*Vicia sativa*	28	11	19	8	0.01	0.02	0.01

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Native	*Vicia sepium*	22	13	9	-4	0.01	0.00	
Native	*Vicia sylvatica*	1	0	1	1	0.00	0.00	
Native	*Vicia tetrasperma*	10	1	9	8	0.00	0.01	
Native	*Viola canina*	4	4	1	-3	0.00	0.00	
Native	*Viola hirta*	6	5	5	0	0.01	0.00	
Native	*Viola lutea*	2	1	1	0	0.00	0.00	
Native	*Viola odorata*	6	5	1	-4	0.00	0.00	
Native	*Viola palustris*	95	70	69	-1	0.06	0.07	0.02
Native	*Viola reichenbachiana*	2	0	2	2	0.00	0.00	
Native	*Viola riviniana*	35	0	35	35	0.00	0.05	
Native	*Viola tricolor*	16	12	5	-7	0.02	0.00	
Native	*Viscum album*	2	0	2	2	0.00	0.00	
Native	*Vulpia bromoides*	6	4	2	-2	0.00	0.00	
Native	*Wahlenbergia hederacea*	2	2	1	-1	0.00	0.00	
Archaeophyte	*Aegopodium podagraria*	6	3	4	1	0.00	0.01	
Archaeophyte	*Agrostis gigantea*	16	6	12	6	0.06	0.07	
Archaeophyte	*Alopecurus myosuroides*	67	22	56	34	0.01	0.07	0.06
Archaeophyte	*Anchusa arvensis*	7	4	4	0	0.00	0.00	
Archaeophyte	*Anisantha sterilis*	64	32	43	11	0.03	0.12	0.08
Archaeophyte	*Anthemis cotula*	2	1	1	0	0.00	0.00	
Archaeophyte	*Apera spica-venti*	1	0	1	1	0.00	0.00	
Archaeophyte	*Armoracia rusticana*	4	2	2	0	0.00	0.00	
Archaeophyte	*Artemisia vulgaris*	18	9	12	3	0.01	0.04	
Archaeophyte	*Avena fatua*	72	49	36	-13	0.07	0.16	0.09
Archaeophyte	*Ballota nigra*	5	2	3	1	0.00	0.00	
Archaeophyte	*Borago officinalis*	1	0	1	1	0.00	0.00	
Archaeophyte	*Brassica rapa*	15	11	5	-6	0.06	0.07	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Archaeophyte	*Capsella bursa-pastoris*	128	89	62	-27	0.08	0.09	0.01
Archaeophyte	*Castanea sativa*	10	6	7	1	0.16	0.17	
Archaeophyte	*Chaenorhinum minus*	1	0	1	1	0.00	0.00	
Archaeophyte	*Chelidonium majus*	1	1	0	-1	0.00	0.00	
Archaeophyte	*Chenopodium bonus-henricus*	6	4	2	-2	0.01	0.00	
Archaeophyte	*Chenopodium ficifolium*	4	3	1	-2	0.00	0.00	
Archaeophyte	*Chenopodium polyspermum*	4	1	3	2	0.00	0.01	
Archaeophyte	*Chrysanthemum segetum*	7	6	3	-3	0.00	0.00	
Archaeophyte	*Cichorium intybus*	1	1	0	-1	0.01	0.00	
Archaeophyte	*Conium maculatum*	5	4	2	-2	0.00	0.00	
Archaeophyte	*Coronopus squamatus*	22	6	17	11	0.00	0.01	
Archaeophyte	*Descurainia sophia*	2	0	2	2	0.00	0.00	
Archaeophyte	*Diplotaxis tenuifolia*	1	1	0	-1	0.00	0.00	
Archaeophyte	*Erysimum cheiranthoides*	3	2	1	-1	0.00	0.00	
Archaeophyte	*Euphorbia exigua*	5	1	4	3	0.00	0.00	
Archaeophyte	*Euphorbia helioscopia*	20	10	12	2	0.01	0.01	0.00
Archaeophyte	*Euphorbia peplus*	4	3	1	-2	0.00	0.00	
Archaeophyte	*Fallopia convolvulus*	69	38	43	5	0.03	0.05	0.03
Archaeophyte	*Fumaria officinalis*	19	11	9	-2	0.01	0.01	
Archaeophyte	*Galeopsis speciosa*	3	1	2	1	0.00	0.00	
Archaeophyte	*Geranium dissectum*	74	31	55	24	0.02	0.06	0.04
Archaeophyte	*Hordeum murinum*	13	6	9	3	0.02	0.02	
Archaeophyte	*Kickxia elatine*	7	3	4	1	0.00	0.00	
Archaeophyte	*Kickxia spuria*	8	2	7	5	0.00	0.00	
Archaeophyte	*Lactuca serriola*	7	0	7	7	0.00	0.00	
Archaeophyte	*Lamium album*	21	9	12	3	0.00	0.01	
Archaeophyte	*Lamium amplexicaule*	6	4	2	-2	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Archaeophyte	*Lamium hybridum*	5	2	3	1	0.00	0.01	
Archaeophyte	*Lamium purpureum*	75	51	44	-7	0.04	0.03	0.00
Archaeophyte	*Legousia hybrida*	1	1	0	-1	0.00	0.00	
Archaeophyte	*Lepidium campestre*	1	0	1	1	0.00	0.00	
Archaeophyte	*Lithospermum arvense*	1	1	0	-1	0.00	0.00	
Archaeophyte	*Malus domestica*	6	0	6	6	0.00	0.07	
Archaeophyte	*Malva sylvestris*	12	8	4	-4	0.01	0.01	
Archaeophyte	*Matricaria recutita*	28	14	15	1	0.01	0.01	0.00
Archaeophyte	*Melilotus altissimus*	1	1	0	-1	0.00	0.00	
Archaeophyte	*Mercurialis annua*	1	0	1	1	0.00	0.00	
Archaeophyte	*Myosotis arvensis*	49	25	32	7	0.01	0.03	0.01
Archaeophyte	*Papaver dubium*	2	2	0	-2	0.00	0.00	
Archaeophyte	*Papaver rhoeas*	23	14	13	-1	0.01	0.01	0.00
Archaeophyte	*Petroselinum crispum*	1	1	0	-1	0.02	0.00	
Archaeophyte	*Picris echioides*	35	12	31	19	0.01	0.02	0.01
Archaeophyte	*Polygonum arenastrum*	2	1	1	0	0.00	0.00	
Archaeophyte	*Prunus domestica*	2	1	2	1	0.00	0.01	
Archaeophyte	*Pyrus communis*	1	0	1	1	0.00	0.02	
Archaeophyte	*Ranunculus arvensis*	1	1	0	-1	0.00	0.00	
Archaeophyte	*Reseda luteola*	2	0	2	2	0.00	0.00	
Archaeophyte	*Salix alba*	1	0	1	1	0.00	0.00	
Archaeophyte	*Salix fragilis*	2	1	1	0	0.00	0.00	
Archaeophyte	*Salix triandra*	1	0	1	1	0.00	0.00	
Archaeophyte	*Salix viminalis*	1	0	1	1	0.00	0.00	
Archaeophyte	*Silene latifolia*	7	2	5	3	0.00	0.01	
Archaeophyte	*Sinapis arvensis*	48	24	27	3	0.02	0.02	0.00
Archaeophyte	*Sisymbrium officinale*	38	15	31	16	0.01	0.02	0.01

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Archaeophyte	*Smyrnium olusatrum*	2	0	2	2	0.00	0.00	
Archaeophyte	*Stachys arvensis*	5	2	3	1	0.00	0.00	
Archaeophyte	*Thlaspi arvense*	5	4	1	-3	0.00	0.00	
Archaeophyte	*Tripleurospermum inodorum*	41	0	41	41	0.00	0.04	
Archaeophyte	*Urtica urens*	29	18	15	-3	0.02	0.03	0.02
Archaeophyte	*Verbena officinalis*	1	0	1	1	0.00	0.00	
Archaeophyte	*Veronica agrestis*	14	6	8	2	0.00	0.01	
Archaeophyte	*Veronica hederifolia*	10	5	6	1	0.00	0.01	
Archaeophyte	*Viola arvensis*	84	58	49	-9	0.08	0.06	-0.03
Archaeophyte	*Vulpia myuros*	2	0	2	2	0.00	0.02	
Neophyte	*Abies alba*	2	2	0	-2	0.03	0.00	
Neophyte	*Acer platanoides*	5	1	4	3	0.00	0.06	
Neophyte	*Acer pseudoplatanus*	76	57	58	1	0.40	0.55	0.15
Neophyte	*Aesculus hippocastanum*	7	2	6	4	0.02	0.06	
Neophyte	*Alnus incana*	2	0	2	2	0.00	0.00	
Neophyte	*Anisantha diandra*	6	0	6	6	0.00	0.02	
Neophyte	*Buddleja davidii*	2	0	2	2	0.00	0.00	
Neophyte	*Calendula officinalis*	1	1	0	-1	0.00	0.00	
Neophyte	*Chamaecyparis lawsoniana*	1	0	1	1	0.00	0.00	
Neophyte	*Claytonia perfoliata*	3	3	0	-3	0.00	0.00	
Neophyte	*Claytonia sibirica*	1	0	1	1	0.00	0.00	
Neophyte	*Conyza canadensis*	5	0	5	5	0.00	0.01	
Neophyte	*Coronopus didymus*	4	1	3	2	0.00	0.00	
Neophyte	*Cotoneaster integrifolius*	2	2	0	-2	0.00	0.00	
Neophyte	*Crepis vesicaria*	4	1	3	2	0.01	0.00	
Neophyte	*Doronicum pardalianches*	1	0	1	1	0.00	0.01	
Neophyte	*Echinochloa crus-galli*	1	0	1	1	0.00	0.00	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Neophyte	*Epilobium brunnescens*	4	1	3	2	0.00	0.01	
Neophyte	*Epilobium ciliatum*	15	9	6	-3	0.00	0.00	
Neophyte	*Fagopyrum esculentum*	1	1	0	-1	0.01	0.00	
Neophyte	*Fallopia japonica*	4	1	4	3	0.00	0.01	
Neophyte	*Fuchsia magellanica*	1	1	0	-1	0.00	0.00	
Neophyte	*Geranium pyrenaicum*	2	1	1	0	0.00	0.00	
Neophyte	*Helianthus annuus*	6	4	2	-2	0.00	0.00	
Neophyte	*Impatiens glandulifera*	2	1	1	0	0.02	0.00	
Neophyte	*Impatiens parviflora*	1	1	0	-1	0.00	0.00	
Neophyte	*Juglans regia*	2	0	2	2	0.00	0.00	
Neophyte	*Juncus tenuis*	1	1	0	-1	0.00	0.00	
Neophyte	*Larix decidua*	1	0	1	1	0.00	0.01	
Neophyte	*Larix kaempferi*	1	0	1	1	0.00	0.03	
Neophyte	*Lepidium draba*	1	1	1	0	0.00	0.00	
Neophyte	*Lilium martagon*	1	1	1	0	0.00	0.00	
Neophyte	*Linum usitatissimum*	3	2	1	-1	0.00	0.02	
Neophyte	*Lolium multiflorum*	109	85	44	-41	0.64	0.55	-0.09
Neophyte	*Lycopersicon esculentum*	1	1	0	-1	0.00	0.00	
Neophyte	*Mahonia aquifolium*	1	0	1	1	0.00	0.00	
Neophyte	*Matricaria discoidea*	90	59	45	-14	0.03	0.08	0.04
Neophyte	*Melilotus albus*	1	0	1	1	0.00	0.01	
Neophyte	*Melilotus officinalis*	1	0	1	1	0.00	0.01	
Neophyte	*Mimulus guttatus*	1	1	0	-1	0.00	0.00	
Neophyte	*Mimulus luteus*	1	1	0	-1	0.00	0.00	
Neophyte	*Pentaglottis sempervirens*	3	1	2	1	0.00	0.00	
Neophyte	*Petasites albus*	1	1	0	-1	0.00	0.00	
Neophyte	*Phacelia tanacetifolia*	4	0	4	4	0.00	0.01	

		Number of unique sites				Percentage cover per quadrat per site		
Status	Latin name	1990 and 2007	1990	2007	Δ *n* sites	1990	2007	Δ cover
Neophyte	*Picea abies*	25	18	14	-4	0.25	0.31	0.06
Neophyte	*Picea sitchensis*	57	44	47	3	2.04	2.36	0.32
Neophyte	*Pinus contorta*	11	10	3	-7	0.26	0.19	
Neophyte	*Pinus nigra*	8	5	4	-1	0.06	0.04	
Neophyte	*Populus canescens*	2	0	2	2	0.00	0.00	
Neophyte	*Prunus laurocerasus*	3	1	2	1	0.00	0.00	
Neophyte	*Pseudotsuga menziesii*	7	6	2	-4	0.12	0.04	
Neophyte	*Quercus cerris*	3	2	2	0	0.00	0.02	
Neophyte	*Quercus ilex*	1	0	1	1	0.00	0.00	
Neophyte	*Brassica napus*	85	46	57	11	0.31	1.06	0.76
Neophyte	*Rhododendron ponticum*	13	9	10	1	0.06	0.12	
Neophyte	*Ribes nigrum*	1	0	1	1	0.00	0.00	
Neophyte	*Ribes uva-crispa*	1	1	0	-1	0.00	0.00	
Neophyte	*Sambucus racemosa*	1	0	1	1	0.00	0.00	
Neophyte	*Senecio squalidus*	4	4	0	-4	0.00	0.00	
Neophyte	*Senecio viscosus*	2	2	0	-2	0.00	0.00	
Neophyte	*Setaria pumila*	1	0	1	1	0.00	0.00	
Neophyte	*Setaria viridis*	1	0	1	1	0.00	0.00	
Neophyte	*Sisymbrium altissimum*	1	1	0	-1	0.00	0.00	
Neophyte	*Solanum tuberosum*	44	35	16	-19	0.07	0.06	-0.01
Neophyte	*Solidago canadensis*	1	0	1	1	0.00	0.00	
Neophyte	*Symphytum uplandicum*	1	0	1	1	0.00	0.00	
Neophyte	*Tamarix gallica*	1	0	1	1	0.00	0.00	
Neophyte	*Thuja plicata*	1	0	1	1	0.00	0.00	
Neophyte	*Trifolium hybridum*	3	2	1	-1	0.01	0.00	
Neophyte	*Tsuga heterophylla*	3	0	3	3	0.00	0.01	